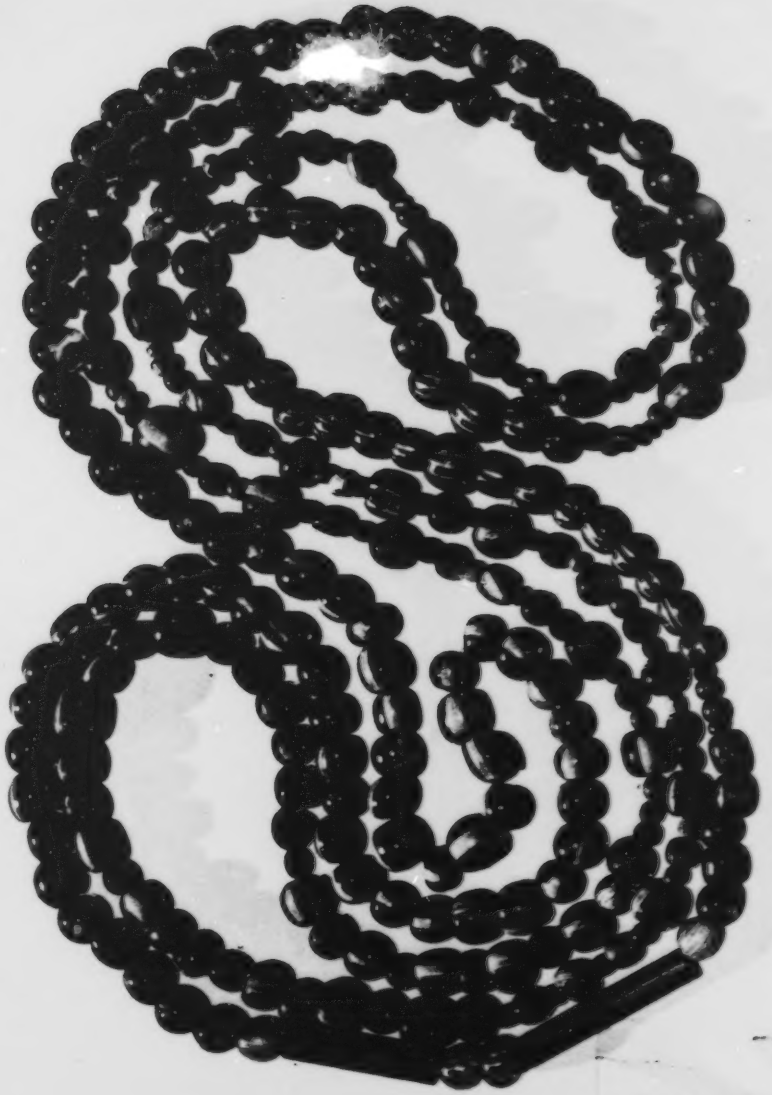
1 Occasional Papers in Archaeology and History No. 1

Canadian Historic Sites



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Archaeological Investigations of the National Historic Sites Service, 1962-1968, by John H. Rick

A Classification System for Glass Beads for the Use of Field Archaeologists, by Kenneth E. and Martha Ann Kidd

The Roma Settlement at Brudenell Point, Prince Edward Island, by Margaret Coleman

Canadian Historic Sites:
Occasional Papers in Archaeology and History – No. 1

National Historic Sites Service
National and Historic Parks Branch
Department of Indian Affairs and Northern Development
Ottawa, 1970

Canadian Historic Sites: Occasional Papers in Archaeology and History, will be published as papers become available. Manuscripts may be submitted to Chief, Research Division, National Historic Sites Service, Department of Indian Affairs and Northern Development, Ottawa 4, Ontario, Canada.

Issued under the authority of the
Honourable Jean Chrétien, PC, MP,
Minister of
Indian Affairs and Northern Development

Produced by the Conservation Group,
Office of the Public Information Adviser
Darrell Eagles: Chief
Gottschalk+Ash Ltd.: Design

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Price: $4.00, Catalogue No: R61-2-1-1
Library of Congress Catalogue Card No: 70-103875
Price subject to change without notice
Information Canada
Ottawa, 1970

Reprinted 1974

MARACLE PRESS LIMITED
07KX 80026-07256

Foreword

The increasing interest of the public in Canada's historic heritage is reflected in the growing number of museums, restorations, commemorations and similar developments sponsored by all levels of government and various private interests. In the federal sphere, responsibility for the selection, management and development of sites of national historic importance rests with the Minister of Indian Affairs and Northern Development. He is advised by the Historic Sites and Monuments Board of Canada, an independent body composed of members from each province, which considers all proposals for commemoration and which recommends to the Minister those persons, places and events which are of sufficient importance to the country as a whole to merit recognition on a national level. The management and development of those sites which the Minister has declared to be of national historic importance are carried out by the National Historic Sites Service (formerly Canadian Historic Sites Division).

The obvious results of the Service's work take the form of National Historic Parks and Sites and involve the staff in architectural restoration and preservation, museums and displays, plaques, period furnishings and pamphlets. Historical and archaeological research play a key role in all of this, for they provide the base of knowledge which enables the Service to develop in a meaningful fashion those sites which have relevance to national history. To date, our work has concentrated on the broad aspects of communication with the general public in the form of site interpretation and we have been unable to give sufficient consideration to communication at the professional level in the form of published research reports. We recognize, however, the obligation of the historian and the archaeologist to make known the results of their work and it is to discharge this obligation that the present series of occasional papers has been inaugurated.

Although our series is primarily designed as a publication medium for the staff of the National Historic Sites Service, we will consider for publication any papers of professional quality that relate to our fields of interest. Papers will be published in both English and French in separate issues, They will be published first in the language in which they are submitted, with the translation appearing as soon as possible. As the name of the series implies, numbers will be issued on an occasional basis, with the timing dependent on the readiness of papers for publication.

The first article is a broad survey intended to introduce the program of historical archaeology carried out by the Department of Indian Affairs and Northern Development since 1962. John H. Rick, formerly Senior Archaeologist in the National Historic Sites Service and now Chief of the Service's Research Division, covers the results of our excavations at various sites across the country and discusses some of the problems encountered. The second article on glass trade beads by Kenneth E. and Martha Ann Kidd presents a new classification system and nomenclature which, it is hoped, will be of benefit to archaeologists who are working with these materials. The system is designed for use in the field, requires no costly nor expensive equipment, and, in addition, is expansible to include any new bead types which may be found in future work in sites in northeastern North America. The final article in this issue is a brief summary of the history of the Roma settlement on Brudenell Point, Prince Edward Island, by Mrs. Margaret Coleman. A report on the archaeological field work at this site during the years 1968 and 1969 will be published in a forthcoming issue.

It is hoped that these papers will receive the critical and helpful attention of those working elsewhere in similar and related fields and will serve as a stimulus to further research in the anthropology and history of Canada.

J. A. MacDonald
Deputy Minister
Department of Indian Affairs and
Northern Development

During the first half of this century, the Government of Canada was involved in a few archaeological excavations of historic sites (e.g., Harper 1960, Kidd 1959), but large-scale federal sponsorship of historic archaeology has developed only within the past five years. This new role has been given impetus by a growing awareness of national identity manifested, at a political level, in increased appropriations for historical and archaeological research and for the educational aspects, such as commemorations and restorations, that derive from such research. Virtually all of the federal government's historic-period excavations have been carried out by two units of the National and Historic Parks Branch of the Department of Indian Affairs and Northern Development, namely, the Fortress of Louisbourg Restoration Section and the National Historic Sites Service. The present paper is an outline of the Service's first five years of archaeological investigation and is intended to acquaint both archaeologists and the public with the nature and scope of this research program.

In the autumn of 1961, the author joined the National Historic Sites Service in the newly-created position of staff archaeologist. At the same time, the Fortress of Louisbourg Restoration Section was established as a separate unit of the National and Historic Parks Branch to carry out the partial reconstruction of the 18th-century French Fortress of Louisbourg on Cape Breton Island, Nova Scotia.

The decision to restore Louisbourg had its genesis in the report of the Rand Commission on Coal (Canada 1960) and was partly based on the need to provide additional employment in the coal mining region of Cape Breton Island. The first area chosen for development was the seawall of the Royal Battery, an outlying fortification across the harbour to the northwest of the fortress proper. This choice had the merit of providing protection for the Battery which had been, and was being, seriously eroded by the sea. Moreover, the project afforded a good deal of employment in aspects of the work which required relatively little archaeological supervision. The author was temporarily attached to the Louisbourg Restoration Section for a number of weeks over the winter and spring of 1961-62 to direct the archaeological phases of the work.

These investigations, plus some earlier tests by Harper (1959), formed a prelude to major archaeological excavations at the site during the summer of 1962. The King's Bastion, an important segment of the defenses of the main fortress, was chosen for excavation. This initial summer's work was directed by James H. Howard (1963) with the assistance of Iain C. Walker, the newly-appointed staff archaeologist for the Louisbourg project. Additional excavations were carried out over the autumn and winter by Walker (1963).

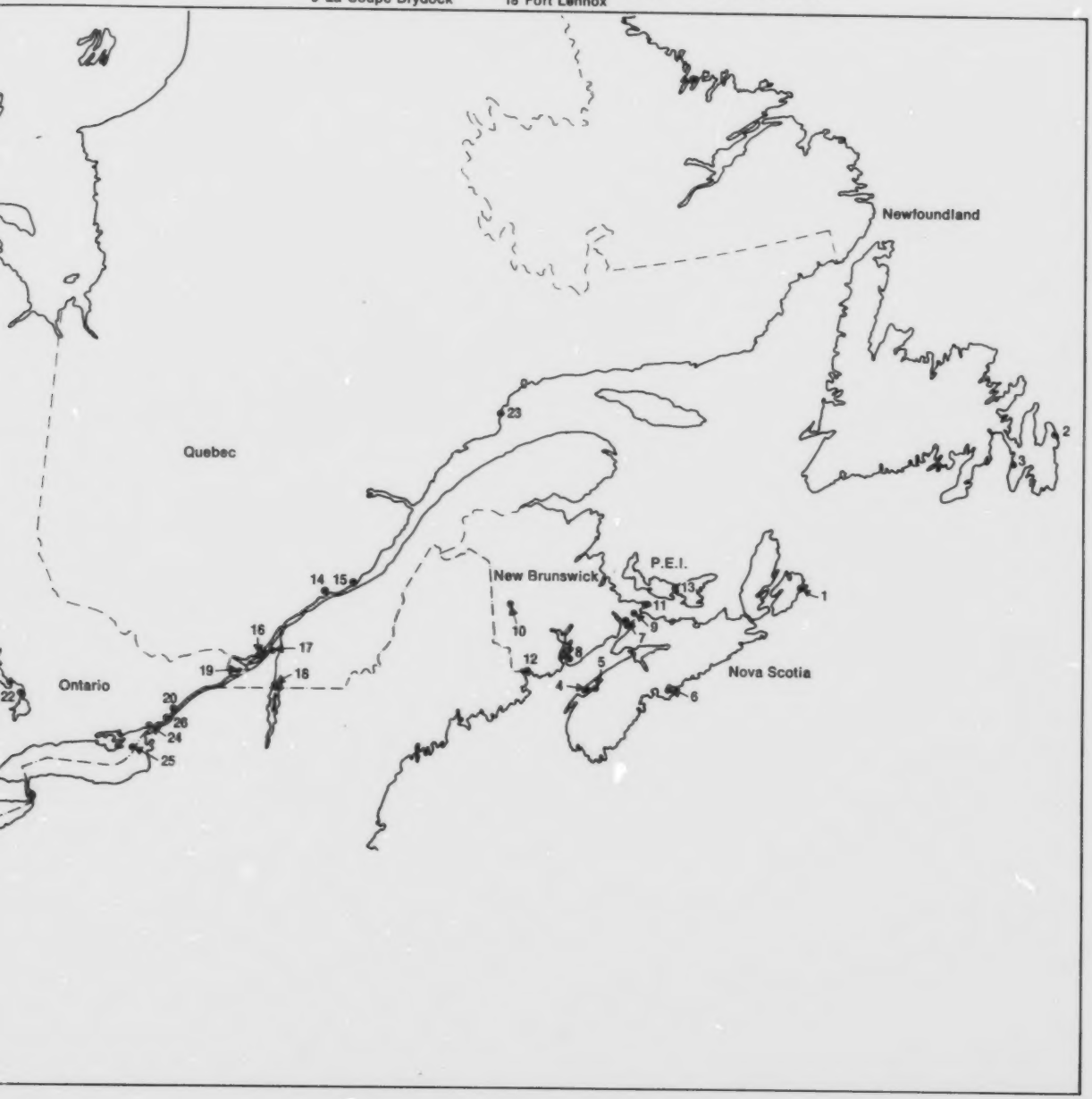
Also during the summer of 1962, Stephen J. Gluckman (1962) directed a detailed underwater archaeological survey of Louisbourg harbour and the adjacent coast, a preliminary reconnaissance having been conducted the previous year by Acadia University (Hansen and Bleakney 1962). A limited amount of salvage was carried out, but Gluckman's main task was to determine the extent and condition of the archaeological material on the harbour bottom; identify, if possible, the remains of the French vessels known to have been sunk in the harbour; and assess the value of a future program of underwater archaeology or salvage in the area. Although there is doubt as to the identity of some of the wrecks found, the results of these surveys are generally encouraging and the harbour at Louisbourg has been closed to diving in order to protect the remains for future research.

In the spring of 1963, Edward McM. Larrabee was appointed senior archaeologist of the Louisbourg project and the excavations at this site continued under his direction through the fall of 1965. Larrabee's report outlining the work at Louisbourg from 1961 to 1965 will appear in the next issue of this series.

Coincident with the first summer's excavations at Louisbourg, the National Historic Sites Service began its own series of archaeological investigations. About two-thirds of this work has been done by outside institutions or individuals under contracts with the Service. The remaining third consists of staff-directed excavations. William J. Folan joined the Service as staff archaeologist in 1965 and he was followed by Jervis D. Swannack, Jr. and Iain C. Walker in 1966. Walter Zacharchuk was appointed assistant supervisor of underwater research in 1965. The following year, two positions for artifact research were authorized and these are filled by Karalee A. Coleman and Jean-Pierre Cloutier.

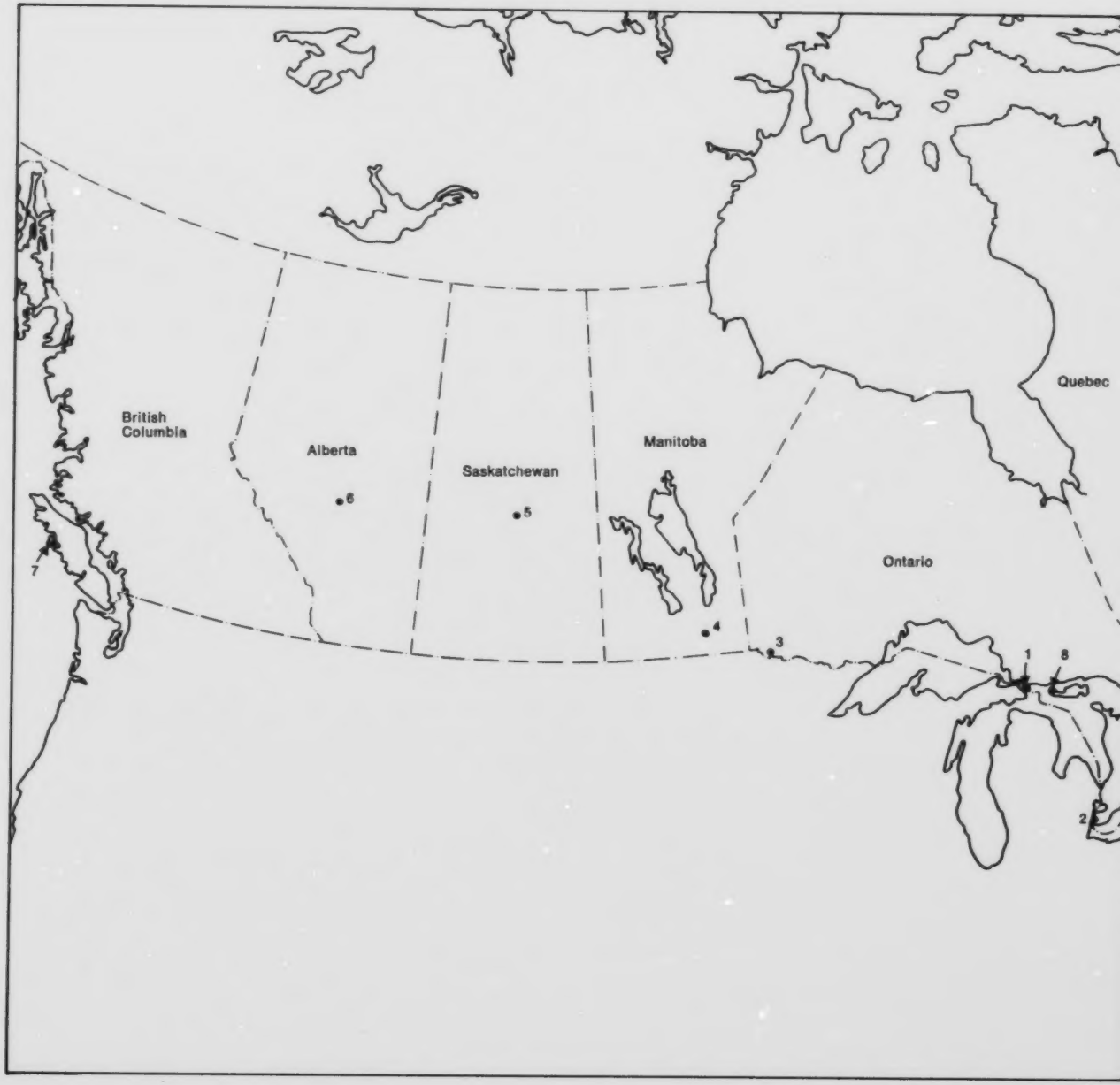
of eastern Canada showing locations of
aeological investigations of the National
oric Sites Service between 1962 and 1966.

1 Fortress of Louisbourg
2 Signal Hill
3 Castle Graves
4 Port Royal Habitation
5 Fort Anne
6 Halifax Citadel
7 Fort Beausejour
8 Fort La Tour
9 La Coupe Drydock
10 Fort Meductic
11 Fort Gaspereau
12 St. Andrews Blockhouse
13 Fort Amherst
14 The Old Jesuit House
15 Cartier's Wintering Place
16 Montreal Town Walls
17 Villa de la Broquerie
18 Fort Lennox
19 Coteau du Lac
20 Fort Wellington
21 Dollier and Galinée Wintering Place
22 Cahiagué
23 Hovenden-Walker Expedition
24 Burnt Island
25 Main Duck Island
26 Patterson Bay



2 Map of western Canada showing locations of archaeological investigations of the National Historic Sites Service between 1962 and 1966.

1 Fort St. Joseph
2 Fort Malden
3 Rainy River Burial Mounds
4 Lower Fort Garry
5 Sturgeon Fort
6 Rocky Mountain House II
7 Yuquot
8 Meldrum Bay



Signal Hill

During the summer of 1965, Edward B. Jelks, assisted by J. Ned Woodall and Carole D. Yawney, directed a three-month excavation program at Signal Hill National Historic Park in St. John's. The following summer, Jelks carried out an additional two months of work, this time with the assistance of Woodall and Stephen B. Archibald.

Signal Hill, a typical rugged Newfoundland headland, dominates the narrow entrance to the harbour of St. John's. This large harbour became one of the focal points of the important Grand Banks fishery early in the 16th century and played an important part in the lengthy struggle between France and Britain for control of North America. The early fortifications were located near sea level, Signal Hill itself not being fortified until the 1790s; consequently, most of the remains on the hill date from the 19th century.

Test excavations were carried out on the site of the proposed visitors' centre to ensure that no archaeological remains would be destroyed by the planned construction, but little of importance was uncovered in this area. Most of the 1965 work was centered on the Queen's Battery, a gun emplacement overlooking the entrance to the harbour; here barracks and magazines were among the structures excavated (Jelks 1965). The second season's excavations (Jelks 1967) included a commissariat building, blockhouse and canteen, all located on Ladies Lookout, the highest point on Signal Hill. These structures date chiefly from the first third of the 19th century, as does the extensive collection of military and civilian artifacts recovered.

Castle Graves

In 1965, Roger T. Grange, Jr., assisted by Karalee A. Coleman and Donald G. MacLeod, excavated Castle Graves, a small stone fort on Castle Hill overlooking the town of Placentia. Construction started in 1694 when the French erected a small masonry redoubt on Castle Hill to protect the low-lying harbour defenses; this redoubt was subject to frequent and extensive changes over the next decade. In 1713, Newfoundland was ceded to the British and the French abandoned the Placentia forts, subsequently establishing their main base at Louisbourg. The British tended to concentrate on the shore defenses immediately around the town, and the fortifications on the hill slowly fell into ruin. The hill was refortified in 1758, but there followed a number of years of neglect interspersed with brief periods of repair and reconstruction. By 1805, the site was virtually abandoned (Ingram 1964).

The 1965 investigations resulted in the complete excavation of all the major buildings in the fort. All of the critical exterior angles were exposed to a degree sufficient to project the line of the masonry wall around the entire perimeter of the redoubt (Grange 1965). The chief areas still undug are the gun platform, the well and the dry masonry wall around the edge of the site; these will be left for investigation in conjunction with future site development work.

Port Royal Habitation

The author, assisted by Ian C. Rodger, carried out brief excavations during the summer of 1962 at the Port Royal Habitation National Historic Park near Lower Granville Ferry. This is the site of a reconstruction of the trading and colonizing settlement built in 1605 under the leadership of the Sieur de Monts, and used as headquarters for about two years by Samuel de Champlain. Reconstruction was under the direction of Kenneth D. Harris (1940; *see also* Jefferys 1939) largely on the basis of documentary information, but supplemented by archaeological investigations conducted by C. Coatsworth Pinkney (1938).

In the autumn of 1960, in the course of digging a posthole at the southwest corner of the Habitation, workmen uncovered a layer of stones approximately eighteen inches below ground surface. As far as they could determine from the limited area exposed, the stones were regularly laid and represented a drain. On the assumption that this feature might be associated with the original Habitation, the hole was immediately filled in and the discovery reported to the National Historic Sites Service in Ottawa.

The 1962 excavations began with a 10 ft. x 10 ft. square surrounding the original posthole. The stones were uncovered and it was soon apparent that they formed part of a layer extending throughout the pit at 1.0 ft.-1.7 ft. below the surface and going down to an unknown depth. With the greater view afforded by the larger excavation unit, it was obvious that the rocks were randomly deposited and did not represent some sort of construction. Since Pinkney (1938) reported encountering filled-in cellars during his excavations at the site, it seemed likely that these stones might also represent cellar fill.

A series of trenches extending outward from the original pit proved this supposition by revealing three walls of a cellar. The final wall, to the south, seems to have been obliterated by the modern road and ditch running past the front of the Habitation.

3 The Lower Queen's Battery of Signal Hill, Newfoundland, after excavation in 1965, looking ENE. toward Cabot Tower in the background. The low scarp (left) was cut to accommodate the wall of Structure 3, whose stone foundations are shown in the centre foreground. Two of the forged iron racers mounted on cut stone curbs (right) may be compared with those of the St. Andrews Blockhouse (*see* Fig. 8).

walls are randomly-laid rubble incor-
ting several large boulders that must
been encountered in digging the cel-
nd found too large to move. It is likely
this structure was built in the late 18th
ury, but a definite date has not yet
established. A coin from the reign of
ge III, found in the rock fill, provides
minus post quem for the filling of the
r. No trace of superstructure was ap-
nt.

Anne

Port Royal of Champlain and de Monts
taken and burned by the British in
However, the captured territory was
ned to the French by treaty in 1632
about 1635, the French governor built
ner fort (also called Port Royal) on the
shore of the Annapolis River across
nnapolis Basin from the original settle-
The new fort changed hands several
before its final capitulation by the
ch to a New England force under
nel Francis Nicholson in 1710. Nichol-
changed the name of the settlement
Port Royal to Annapolis Royal. The
nt Fort Anne is the outgrowth of two
ch fortifications built on the same site
ater British additions.

ncurrent with the digging at the Habi-
, excavations were carried out at the
er 2 Powder Magazine in Fort Anne.
nagazine, built by the French in 1708,
ated within Berry's Bastion, and is at
nt separated from the fill of the bas-
y a stone wall which holds back the
and forms a narrow passageway
d three sides of the magazine. On the
side of the magazine, the front, the
ge walls terminate in a flight of steps
g from the level of the fort square
to the much lower level of the maga-
loor. Although the building itself
s never to have been subjected to
alterations, 18th-century plans in-
that the retaining walls around it
remodelled many times and that the
geway varied in width from 2.5 ft. to
ocumentary sources also suggest that
agazine had once been entered direct-
ly from the square, rather than being several feet below the level of the square as is now the case. Since the magazine was scheduled for a certain amount of restoration, it was considered necessary to determine the number and position of previous retaining walls (and, hence, the accuracy of the various plans), and to locate the level of ground surface in the 18th century.

Excavation established that the magazine had once been entered directly from the square without the necessity of steps. A trench was dug to the west of the powder magazine, running from the side of the magazine through the retaining wall and extending some ten feet into the fill of the bastion. It would appear, from this latter trench, that the present retaining wall may actually represent two construction phases, the first wall being of rubble stone in mortar and the later wall consisting of a brick facing added to the original; no traces of other walls were uncovered. In the course of excavations, a shallow brick drain was found extending around the sides and back of the magazine at the level of the top of the retaining wall; this drain may have been put in as part of a series of alterations proposed in 1795.

In 1963, the author, again assisted by Ian C. Rodger, began the summer field season with a brief excavation at Fort Anne. Documentary sources had suggested the location of a midden near the officers' quarters, and it was hoped that excavation would yield a stratified series of artifacts which would facilitate dating at other sites. Artifacts were abundant, but the stratigraphy did not live up to expectations since the entire area had apparently been badly disturbed by the construction of a road into the fort a number of years ago. The only find of interest was a stone wall, possibly the remains of a French-period gateway.

While working at Fort Anne, it was decided to reopen the previous year's trench on the west side of the Number 2 Powder Magazine on the chance that deepening that excavation might reveal stubs of earlier retaining walls. No walls were found, but a skeleton enclosed in a rotted wooden coffin was uncovered. Much of the coffin lay directly under the retaining wall so that the lower limbs could be reached only by tunneling. Most of the bones were recovered, but it was not possible, in that confined space, to remove all of the foot bones, some of which were cemented into the mortar of the bottom of the wall. Casual inspection suggests that the skeleton is that of a Caucasian female, but a more detailed examination is being made. A few coffin nails were the only artifacts found.

Stratigraphic evidence indicates that the burial took place some time before the construction of Berry's Bastion about 1702. When the Number 2 Powder Magazine was built six years later, its construction necessitated a deep cut into the earth fill of the bastion and, in the course of this excavation, the French workmen cut through the grave shaft and into the top of the coffin. By this time, the body had been in the ground long enough for the coffin to have rotted and been compressed into a space about 0.4 ft. high. The lower jaw and the atlas vertebra were not found in association with the remaining bones, but seem to have come from higher up in the bastion fill; one femur, the skull and the remaining cervical vertebrae could not be located although all backdirt was screened three times through quarter-inch mesh. The missing bones, like the atlas and the jaw, may have been thrown back into the pit fill in 1710 and remain to be discovered, or they may have been carried off by the French workmen as souvenirs.

The excavation leaves little doubt that the present retaining wall is the only such wall to have been built around the powder magazine. Early plans showing a variety of walls would seem to be erroneous.

Halifax Citadel

The City of Halifax was founded in 1749 as a major British military base against the French. Four successive forts were built on the summit of Citadel Hill, the present Halifax Citadel being the latest of these. Since the later and larger forts occupied

4 Surrounding the Number 2 Powder Magazine at Fort Anne and just below present ground surface is the shallow brick drain shown in this photograph. The drain is constructed of one layer of bricks embedded in sand and is probably associated with roof modifications made during the British period. In the foreground, below the drain, is the top of the French retaining wall which held back the earth from contact with the magazine walls.

a greater area, their construction was preceded by the levelling of the earlier works and the cutting down of the summit of the hill to form a lower and broader base. The hill was reduced nearly thirty-two feet in height in the course of two centuries and, consequently, construction of the present Halifax Citadel has resulted in the obliteration of almost all traces of its predecessors. Work on the latest Citadel began in 1828 and was completed only a short time before the advent of rifled ordnance rendered the fortifications obsolete.

Because of the extent of above-ground construction and the absence of earlier remains, restoration at Halifax Citadel is properly a problem for historians and architects rather than archaeologists. However, where digging for restoration or maintenance purposes has threatened areas in which it was felt that some stratigraphic evidence might survive, archaeologists were called in to supervise the excavations.

Early in 1965, Richard B. Lane and later, Urve Linnamae were temporarily transferred from Louisbourg to supervise salvage excavations along the northwest face of the redan which contains the exterior entrance to the Citadel. This work exposed a complex series of drains near the salient of the redan as well as three underground casemates abutting the northern areaway wall. The drains appear to be contemporaneous with the casemates, both dating from about 1843 (Lane 1965).

During the late spring of 1965, Karalee A. Coleman carried out excavations to locate and record the original drainage system in the Citadel's dry moat. Much of this was due to be destroyed by the proposed installation of new and more efficient drains and in various other repairs to the fort. Although a good deal of the stratigraphic evidence had already been destroyed by 20th-century activity, it was found that the early drainage system had consisted of a narrow, open ditch circling the fort and the ravelins; the moat bottom had originally sloped gently downwards from escarp and counterscarp into this ditch. The main ditch was joined by subsidiary channels which led from the firing stations behind the counterscarp and from those few casemate drains which did not connect with the complex interior drainage system of the fort. The whole system emptied into six strategically located stone catch basins which conducted the water via underground drains through the counterscarp to the bottom of the glacis. Very few artifacts were found in the moat and no early specimens were uncovered in the drainage ditches, suggesting that maintenance of the drains was stressed during occupation, and that garbage was not disposed of haphazardly. One dump area was found near the north ravelin, but elsewhere it appears that the moat was periodically cleaned, contained well defined, restricted ash pits, or else was simply forbidden for garbage disposal.

Also exposed in the moat was an unexpected defensive feature in the form of a wooden palisade extending from the southwest demi-bastion escarp to the southwest corner counterscarp. Presumably this was built to restrict the movements of the enemy should he gain entry into the moat; similar structures probably existed in other corners as well (Coleman 1965).

Fort Beausejour

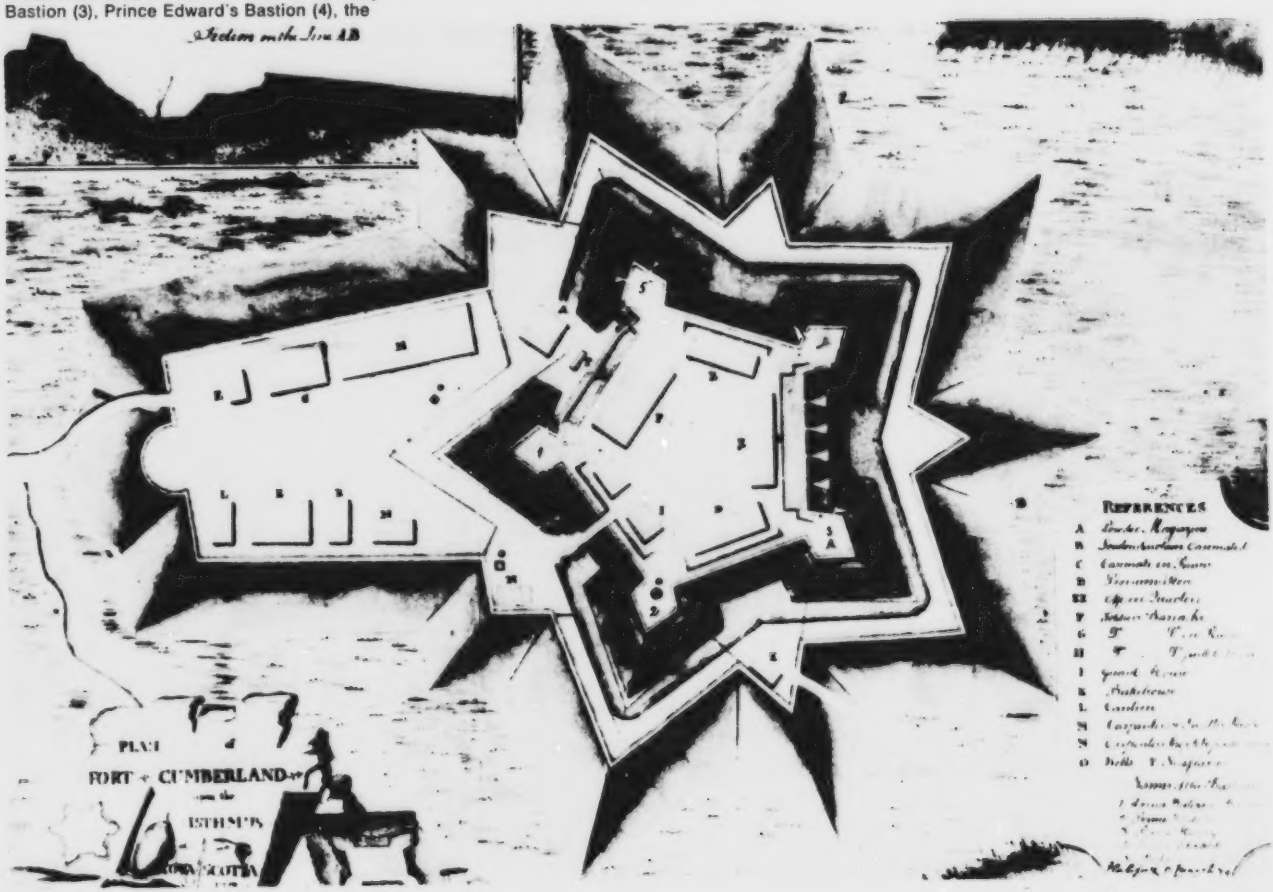
In June, 1962, the author, assisted by Ian C. Rodger, began test excavations at Fort Beausejour, near Aulac on the New Brunswick-Nova Scotia border. The work was intended to determine the nature and condition of the subsurface remains and to check the accuracy of various 18th-century documentary sources describing the site.

Fort Beausejour, located on a long ridge between the Aulac and Missaguash rivers and overlooking Chignecto Bay, was originally constructed by the French in 1751 as a defence against the British Fort Lawrence which stood on a parallel ridge about a mile and a half to the southeast. In 1755, before its actual completion, Beausejour was captured by the British and renamed Fort Cumberland. The British occupation was marked by extensive reconstruction; the new design included a large, quadrilateral earthwork, encompassing at least eight buildings, constructed against the west side of the main fort.

Trenching showed this British earthwork to have been a low, sod-faced wall and firing step; from the top of the wall, the ground outside the earthwork sloped gently downwards forming the glacis. An unusually large number of artifacts were found beneath the surface of the slope, possibly representing a redeposition of earlier material from a midden that had been raided to provide fill for the construction of the new wall and glacis.

The main part of the fortifications, east of the British earthworks, consists of a pentagonal enclosure with five bastions. A series of trenches was dug along the foot of, and into, the Prince Frederick Bastion while other cuts were made in the curtain and across the moat. These excavations showed the fortification walls to have been constructed of earth covered with a sod facing and enclosed at the bottom by a low stone wall. This latter presumably served as a retaining wall to retard slippage of the earth masses above. Fragments of rotted wood found in the right face of the bastion may represent a *palisade en fraise*. In view of the steepness of the earth wall,

5 A plan of Fort Beausejour (Fort Cumberland) drawn in 1778. Note the quadrilateral earthwork, a British addition, extending to the left of the principal fortifications. The stone curtain wall, referred to in the text, runs between Prince William's Bastion (1) and the Duke's Bastion (5). Areas excavated in 1966 are the Prince Henry Bastion (3), Prince Edward's Bastion (4), the two Officers' Quarters in the fort's parade (E) and the Men's Barracks (D) which, in 1778, was used as a provisions store.



e Men's Barracks at Fort Beausejour on
mpletion of the 1966 excavations. This struc-
e is shown as "D" on the 1778 plan and was
ed as a provisions store at the time the plan
s drawn. The bricks adjacent to the building
y represent a shallow drain similar to that
covered in the excavations around the
mber 8 Magazine at Fort Anne. The earth embankment at the left is the curtain between the Prince Henry Bastion and Prince Frederic's Bastion. The body of water in the background is the Cumberland Basin at the head of the Bay of Fundy.

it seems strange that no traces of timber revetting were discovered.

A trench was dug across the counterscarp opposite the Prince Frederick Bastion. The line marking the sod facing of the counterscarp was very difficult to trace, but there is no evidence that this wall had been anything but a sod-faced bank of earth, with, probably, a banquette of similar construction. There was no evidence of pickets along the crest of the glacis as might have been expected from the documentary accounts.

The only excavation carried out inside the fort proper was a test-pit in the centre of the Prince Frederick Bastion. Documentary sources describe a well in this bastion, plus an underground storage chamber connected to the interior of the fort by a passageway through the gorge. Other bastions also were reported to have contained storage rooms or magazines but Prince Frederick's was chosen for excavation because the surface contours suggested a greater chance of finding a room that had not fallen in. However, when the well and the east wall of the passage were uncovered, both were found to be in a state of partial collapse. The footings of the stone passage wall were located at approximately thirteen feet below present ground surface (i.e., below the top of the interior of the bastion), but rain-weakened excavation walls and lack of time prevented any attempts to dig within the passageway and the well, or to locate the storeroom.

Only one curtain wall within the fort is not sod-faced. The wall in question is of stone and lies at the east end of the British earthworks between the Prince William Bastion and the Duke of Cumberland Bastion; it is loopholed for rifle fire, presumably to protect the powder magazine directly in front of it. This wall had been partially rebuilt some thirty years ago and a few small excavations against the still-buried portions of the wall were sufficient to confirm the accuracy of the reconstruction. Trenches in the left face and flank of the Prince William Bastion showed that this bastion had been constructed in much the same way as Prince Frederick's. An attempt to excavate within the powder magazine was blocked by water seepage, a result of the heavy rains of the summer.

Insofar as productive excavation was concerned, over half of the two-month stay at Fort Beausejour was wasted because of the abnormally heavy rains and the consequent high water table. Unfortunately, this meant that a number of excavation units started in the relatively dry weather early in June could not later be extended as the problems dictated. The result was a number of discrete excavations, each providing information about structures and artifacts, but unrelated one to another and difficult to tie in with a concept of the site as a whole. Nevertheless, the work did result in a preliminary development plan which culminated in the more extensive 1966 excavations discussed below.

The final 1962 excavations in this area were carried out on the shore of Cumberland Basin immediately southwest of Fort Beausejour. Neil Williams and Adrian King of the federal Department of Agriculture reported the finding of human bones protruding from what is believed to be a French-period dike. The skeleton proved to be a single extended burial, lying within a narrow, shallow grave. Sea action had eroded away the grave fill and exposed the leg bones almost up to the pelvis; however, enough earth remained over the opposite end of the skeleton to show that the burial was definitely under the remains of a dike. Although the outlines of the grave were fairly distinct, the heavy clay soil showed no trace of the ground surface through which the grave must have been dug. It was quite clear, however, that the grave shaft did not extend upwards to anywhere near the present top of the dike, and the dike must once have been a good many feet higher. The corpse was buried, therefore, either before or, more probably, during the construction of the dike, but certainly not after. As yet, the date of the building of this dike has not been established. Excavation of the burial was hampered by the fact that the grave and the remains of the dike above it were under water during periods o high tide.

The bones of the hands and feet we completely missing as were some of t vertebrae, the facial bones, the lower all of the teeth, and most of the ribs; t absence of these parts seems attribut to decomposition. All bones found we very poor state of preservation; the pe for example, being completely fragme Interestingly enough, the hair has sur on those portions of the skull which w still intact. The skeletal remains have yet been studied with a view to deterr race, sex, etc., and it is highly unlikely much information will be forthcoming sidering the condition of the bones. A fragment of what appears to be a coa woven material and a brown substanc may be decomposed leather were the two artifacts found.

The following year, 1963, Williams a King discovered a second skeleton in proximity to the site of the first. Norm Barka, who was excavating in the are this time, was asked to investigate. H reported a burial similar to the previo one. No artifacts were found, but the are in much better condition than thos the first skeleton and analysis of the mains should establish whether these white or Indian burials.

No archaeological investigations w undertaken in the Beausejour area in but the following summer it was nece to carry out a one-month program of vage excavations on the stone curtai between the Prince William and the D of Cumberland bastions. Frost action caused a steady deterioration in the sonry and, by 1965, it was necessary dismantle the wall in order to rebuild a more stable foundation. The author test excavations had shown at least o end of the wall (i.e., the part within th mass of the bastion) plus the lower c in the centre of the wall to be origina stonework. It was considered importa provide archaeological supervision f dismantling of the wall since this wou necessitate extensive excavations in

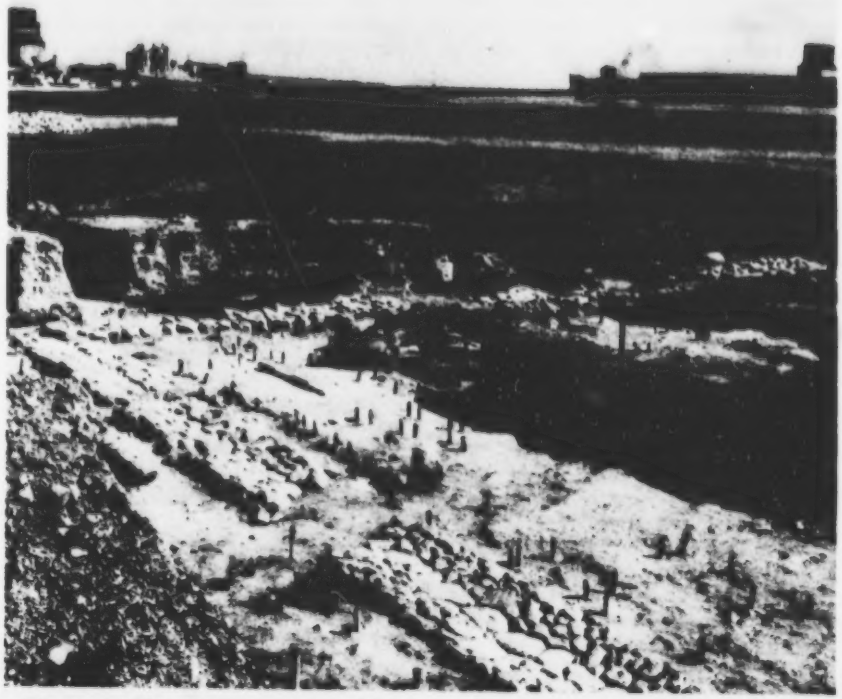
7 The North Compound of Fort La Tour, showing cobblestone drains and the remains of a wall and fireplace. The position of floor joists is marked by wooden stakes. The view is to the southeast across the harbour of Saint John towards the Bay of Fundy.

to undisturbed portions of the bastions. Henry E. Sauerbrunn was awarded a contract for this work. A number of interesting architectural features were uncovered, chief amongst which was an L-shaped stone sally port through the Prince William Bastion at the end of the curtain.

The preliminary excavations at Fort Beausejour had established the need for more intensive archaeological investigation as a necessary prelude to the development of the site. This work had not been scheduled to take place for a number of years, but the dismantling of the stone curtain wall provided an obvious answer to the most pressing logistical problem, namely the removal of backdirt from within the confines of the fort. In order to take advantage of the absence of this wall, a three-year program of excavations, under the direction of Jervis D. Swannack, Jr., was immediately scheduled and the first season's work began late in May of 1966. Karalee A. Coleman and Denys Delage were the senior assistants.

Excavation in the Prince Edward Bastion revealed the collapsed timber remains of a powder magazine constructed by the French in 1751. This structure 20 ft. x 13 ft. with a two-layered gable roof covered by a thick coating of heavy clay, was connected to the parade by a 4 ft. wide passage through the gorge. Other trenches in the bastion located a gun platform, the terreplein of the rampart and the remains of palisade posts presumably dating from 1751, prior to the construction of the earth ramparts.

A 61 ft. x 27 ft. casemate was uncovered in the Prince Henry Bastion. The roof of untrimmed logs was poorly preserved, but most of the floor boards were sound. An anvil and two barrels of what may have been soldering flux suggest that this structure was used for metal-working. This casemate was built in 1752 or 1753, but had fallen into disrepair by 1756 and was not used by the British. Also found in this bastion were a dry-laid rubble facing or revetment for the escarp, a gun platform and traces of what may be the original 1751 French wooden palisade.



On the east side of the parade, the 70 ft. x 16 ft. men's barracks was almost completely excavated. Fireplaces, an oven, partitions for six rooms, light wells for basement windows and at least two basement floor levels were the interior features found. Excavations in 1967 will complete the subfloor testing.

About half of the officers' barracks on the west side of the parade was excavated during the 1966 season. A "drain" similar to that surrounding the men's barracks was uncovered but only along the east side of the officers' quarters. A definite drain, deep, masonry-lined with troughed plank floor, was located in the southeast corner of this building and was found to lead below a probable masonry passage into the Duke of Cumberland Bastion. Next season, this bastion will be excavated along with the remainder of the officers' barracks.

Large quantities of artifacts were found in the two barracks and present evidence, primarily from pipes and ceramics, suggests an early 19th-century date (hence, British occupation) for both. It is expected that analysis will reveal a definite French-occupation component associated with the powder magazine and the casemate.

Fort La Tour

In 1963, Norman F. Barka was awarded a contract to complete the excavation of Fort La Tour, a fortified French trading post at the mouth of the Saint John River. Built by Charles de la Tour in 1631, the post was destroyed by a rival French trader in 1645. The immediate purpose of the excavation, and of the simultaneous archival research being carried out in France, was to ascertain whether sufficient information still survives to permit reconstruction of the fort. Approximately one-quarter of the site had already been excavated by J. Russell Harper (1956a, b) for the New Brunswick Museum (*see also* Omwake 1957a, b). He discovered that the La Tour occupation overlay Indian remains from two different time periods. The earlier culture he related to the Maine Cemetery Complex dating (Harper 1957a) from 3,500-4,000 years ago. The second occupation, he felt, may represent early historic-period Micmac. Evidence of a post-La Tour Indian occupation, including two burials, was also found. Concurrently with his second season at Fort La Tour, Harper (1957b) excavated 17th-century Indian burials near Pictou, Nova Scotia and he argued, on the basis of both artifacts and historic evidence, that these date from sometime after 1645, but prior to 1670.

Barka's excavations showed the La Tour settlement to have been much larger than was thought. He demonstrated two distinct construction phases and advanced the argument that the second phase dated from La Tour's marriage in 1641. Barka also excavated a trading post built by Simonds, Hazen and White of Massachusetts in 1762 on top of the earlier French site; these 18th-century remains had been discovered by Harper, but had not been extensively dug. An extensive study of the artifacts from this site has been completed and is contained in Barka's final report (1365).

La Coupe Drydock

During the summer of 1963, Barka (1966b) also briefly investigated the La Coupe Drydock on the Chignecto Isthmus in New Brunswick. This structure is an arrangement of earth dikes forming a 250 ft. x 120 ft. quadrilateral which straddles the La Coupe River a short distance above its confluence with the Aulac. J. C. Webster (1933) felt that this earthwork must have functioned as a dry-dock utilizing the great changes in the Fundy tides to float craft in and out easily. He himself could find no documents relating to this construction, but thought that it had most likely been built at the end of the 17th century or the beginning of the 18th century. More recent research carried out by the National Historic Sites Service in French and English archives has produced neither confirmation nor refutation of this belief. Barka's excavations confirmed that the "drydock" was man-made and he concurred with Webster's identification of the function of this structure; however, there is little solid evidence to support this claim. The case made by Webster and Barka seems to rest chiefly on unproved assumptions about 18th-century water levels and on the fact that no one has adduced any other plausible use for the earthwork. In the opinion of this author, the function of the La Coupe Drydock remains to be established.

Fort Meductic

In 1964, the New Brunswick Electric Power Commission offered to finance salvage excavations at Fort Meductic, a contact-period Malecite village on the Saint John River near Woodstock. This site was to be flooded by the proposed Mactaquac Dam. The National Historic Sites Service agreed to find an archaeologist to direct the operations and to arrange for the preparation and publication of a final report. Through the courtesy of the United States Department of the Interior, Louis R. Caywood of the U.S. National Park Service was released for a three-month period to head the salvage project.

There is relatively little documentary information available about Meductic. It appears to have been one of the principal settlements of the Malecites who allied themselves with the French against the British to the south. The village is located on the regular artery of communication between Quebec and Acadia – the Saint John River, near its confluence with the Eel (or Meductic) River; this latter is the beginning of the main portage route into northern Maine and Massachusetts. The site had been visited by the French at least as early as 1671 and a missionary was in residence there shortly after 1686. A church was built by 1720, apparently replacing an earlier bark structure. This site seems to have been abandoned by 1767 although there was a brief resettlement of Malecites in the area for a few years after 1789 (Lee 1966).

Caywood, assisted by George A. Long, carried out three months of excavation at Meductic and also examined a nearby location locally believed to be the site of a former trading post. Investigations at Meductic were in some respects disappointing since there had been much disturbance due to cultivation and a considerable portion of the site appears to have eroded into the river. The village was surrounded by a moat, in places six feet deep, but no evidence of the expected palisading was found; two possible gate areas were uncovered. The cemetery was located and briefly tested, but the skeletal material was too poorly preserved to be removed. Much of the living area within the fort was excavated, the chief finds being firepits and burned rock. The priest's house appeared as a concentration of burned earth, a stone fireplace, wrought nails and window glass. Of the church, only a dark stain which may be the remains of a wooden foundation, some nails and window glass were found. Some of the clay pipes recovered by Caywood have been analysed (Walker 1965) and were found to date from the 19th and late 18th centuries.

A cellar, tentatively dated by the artifacts to around 1800, was also discovered at Meductic; this could be the remains of a school known to have been built in 1788 by an Anglican minister. The "trading post" proved to be an earth-floored, slab-lined cellar filled with brick and large building stones, but the identity of this structure has

not yet been established. Three wigwam locations were noted nearby (Caywood 1964).

Fort Gaspereau

In 1966, Iain C. Walker, assisted by Elizabeth A. Wylie, directed excavations at Fort Gaspereau on the northeast coast of New Brunswick, near Port Elgin. This small fort was built by the French in 1750-51 and served as a staging post for provisions shipped across the isthmus of Chignecto to Fort Beausejour, twenty miles away. The fort surrendered to the British in 1755 following the capture of Beausejour and was subsequently renamed Fort Monckton. For a brief period it became one of the centres for attack against the Acadians, but the British soon decided that the fort was no longer of importance and by November, 1756, it had been abandoned and burned. Some of the fort has been lost through sea erosion and much of it was damaged by cultivation and by well-meaning attempts, during the 1930s, to "improve" the site for visitors.

Documentary information on Fort Gaspereau is scanty and the 1966 excavations were intended to provide a better picture of the site to facilitate development planning for the Beausejour area. The boulder foundations of the southwest bastion were uncovered, the Commandant's Quarters was excavated and the palisade trench was located on all four sides. The collection of artifacts, though small, is quite closely dated and should prove valuable in comparative studies.

St. Andrews Blockhouse

During the summer of 1966, DiAnn L. Herst, assisted by Judith A. Miller, excavated the battery at St. Andrews Blockhouse. The original fortifications had been built by the townspeople as protection against the Americans shortly after war was declared in 1812. The need for defences ended with the peace in 1814 and, although the blockhouse continued to be used for various purposes, the battery was in an advanced state of decay by the 1830s (Ingram 1965).

The purpose of the excavations was to determine the nature and location of the three cannon platforms as an aid to the restoration of the site. These were semi-circular stone structures upon which had been mounted racers and each had an inner platform supporting the gun pivot. The platforms had mounted 18-pounder guns on wooden carriages and had been designed to allow the raised cannons to pivot and fire *en barbette* over the earth ramparts. While traversing platforms were common by this time, it is unusual to find such complex platforms at such a small defence unit (Herst 1966). In addition to the platforms, two lines of wooden palisades were located connecting the exterior of the battery to the corners of the blockhouse.

Fort Amherst

During the summer of 1963, the author, assisted by Ian C. Rodger, directed the partial excavation of Fort Amherst, a rectangular earth redoubt near Rocky Point. This area was settled after the capitulation of Port Royal in 1710 which prompted some Acadians to move to Ile Saint-Jean (Prince Edward Island). This new settlement was named Port la Joye and its fortunes were intimately bound up with Louisbourg. When that fortress fell in 1758, the French possessions on Prince Edward Island were ceded to the British and Fort Amherst was built the same year, supposedly replacing French fortifications at the same spot. In 1763, at the end of the Seven Years' War, Fort Amherst lost its military usefulness and subsequent documents refer only to its continuing decay. By 1771, the fort property appears to have been turned over to private settlers (Hornby 1965).

The first excavations cut through the ramparts and across the ditch to the crest of the glacis. This work showed that the ditch had been dug out of the soft bedrock of the area and that the loose stone had been piled up to form the ramparts. Both the inner and outer faces of the rampart were sod-covered, as was the counterscarp; there were no signs of the picketing. Except for an area around the gate, very few artifacts were found in the moat.

The interior of the fort consists of a flat central area surrounded by eight large depressions. Two adjacent depressions were excavated and were found to be semi-subterranean "rooms" cut into bedrock. One chamber is U-shaped, the other rectangular, and both are connected by a narrow (about 20" wide) passageway cut out of the rock. Both were filled with brick, rubble stone, burned wood and large quantities of artifacts. No clear indication was found as to how these "rooms" had been entered, whether or not they had been roofed, or for what purpose they had been used. They might well have been storage areas, but, with bedrock so close to ground surface, drainage must have been a problem.

8 The southeast gun platform adjacent to the St. Andrews Blockhouse. The semi-circular line of stones was the base for the racer while the central group of stones supported the pivot for the traversing carriage. The three cedar logs in the foreground are the remnants of what may have been a "ready hut" behind the guns. At the extreme right (separated by an excavation balk) may be seen part of the racer foundations for the centremost of the three gun positions. In the background, beyond the eroded earthwork is the channel leading to the harbour of St. Andrews and Navy Island which screens the harbour from the U.S. shore.

A view along the "base" of the U-shaped, semi-subterranean chamber at Fort Amherst after excavation. At the rear (behind the vertical photographic scales) is a narrow passage leading into a rectangular chamber. In this photograph, the foreground walls appear to be of earth, but are, in fact, cut out of the soft rock.

bout half of the central area of the fort excavated and the stone foundations of a ding–possibly a blockhouse–were uncov-. The stones had been laid directly on ock which, in this part of the redoubt, es to within two feet of ground surface. ough much brick was found, both within structure and in the semi-subterranean ms," there is no clear evidence that that had been employed in the construction fort. The dismantling of the buildings, rently sometime before 1775, appears to been a very thorough job.

drock outside the central structure is ly cut up by narrow trenches and by roughly circular, shallow holes of unknown use. One trench begins in a rough depression outside the foundation wall, continues underneath the wall and terminates, near the centre of the building, in a shallow basin cut into bedrock and enclosed by a low coping of rough-cut stones. Another trench, lined with wood, parallels one exterior wall of the building and probably served as a rain gutter, but the remaining holes and trenches do not seem explicable in terms of either drainage or water storage.

Several areas outside of the redoubt were selected for test excavations on the basis of aerial photographs, but these tests revealed no trace of the anticipated French remains. The documents covering both French and British occupations are few, uninformative, frequently contradictory and generally difficult to interpret in the light of the archaeological findings. It is hoped that analysis of the many artifacts recovered plus some further excavation at the site will yield an explanation of some of the puzzling features found.

The Old Jesuit House

In September of 1962, the author began excavations at the "Old Jesuit House" in the Quebec City suburb of Sillery. This house stands on the site of a Jesuit mission built in 1637 and destroyed by fire twenty years later. Representations had been made to the Historic Sites and Monuments Board of Canada to declare the house a site of national importance, primarily because of its supposed association with important historical figures during the 1637-57 period. Documentary and architectural evidence proved inconclusive, and archaeological investigations were carried out in an effort to determine the relationship of the present structure to the original mission.

The cellar of the Jesuit House is divided roughly in two by a transverse wall; the east half is a single open space, while the west portion is filled with earth to the height of the ground floor joists. This situation presented two obvious possibilities, the first being that the exterior walls of the present cellar were built as a unit with the transverse wall as a later addition. Alternatively, the earth-filled half could represent the foundations of a smaller, earlier structure of which the east wall was the present transverse wall; this would mean that the east half of the existing cellar represents a later period of construction. Since the transverse wall had been cut away at either end, it was not possible to establish its relationship with the north and south exterior walls; however, trenches excavated outside the house against the north wall indicated that the foundations of the Old Jesuit House represent a single piece of construction.

The Old Jesuit House is situated at the bottom of a steep bluff where runoff is sufficient, even under normal weather conditions, to cover the cellar floor with several inches of water and to flood the low spots in the back yard. Made worse by an unusually wet summer, these water conditions forced suspension of the excavations. The Engineering and Architectural Division of the National and Historic Parks Branch was called in to construct a drainage system which would permit digging the next summer.

The drains, installed in the autumn of 1962, reduced the flow of ground water to a manageable level. More important, the trenches for these drains revealed the stub of a three-foot thick stone wall to the north of the present house. The author and his assistant, Ian C. Rodger, returned to the site in August of 1963. Excavations showed this wall to be the remains of the north curtain of the mission fortifications. The northwest bastion – a round, stone tower – was also uncovered, as was part of the west curtain. One small portion of the east curtain was found. The south wall and its two bastions appear to be under a railway embankment and the northeast bastion seems to have been destroyed in the building of a neighbouring house. These excavations established that the present house is located on the mission site, but did nothing to prove or disprove its antiquity.

Early in 1964, the owners of the house removed the flooring above the west half of the cellar, thereby affording an opportunity to dig in this area. Rodger began excavations in March; he discovered the remains of a stone wall forming part of two sides of an earlier structure which had been cut through to build the foundations of the existing house. On this evidence, the Old Jesuit House must post-date the main period of mission activity.

The final excavations were carried out by Rodger and the author during the latter part of May, 1964. While several small walls were uncovered in front of the Old Jesuit House, these could not be traced without tearing up the heavily travelled street which bisects the site. A stone wall was discovered extending at right angles east from the west curtain, but a large tree had obliterated the crucial junction; this new wall was followed until it ran under a modern annex to the Old Jesuit House. A brief excavation carried out beside the chapel revealed several poorly preserved skeletons of children. The chapel itself had been thoroughly excavated in the late 19th century and additional work in this area seemed pointless.

Except for one or two strata imm
above bedrock, there is little undist
ground at the site. Constant activity
three centuries (including construct
a paved street through the middle o
site) has made it virtually impossibl
trace stratigraphy from structures of
date (such as the chapel and the fo
tions) across the site to the present
Artifacts were abundant, but occu
almost entirely in the upper, disturb
levels; nothing was found that coul
stratigraphically associated with kn
early walls. The study of this materi
yet complete, but so far nothing of
putably 17th-century origin has bee
tified. There is, however, no eviden
suggest that buildings existed on th
prior to the 1637 construction. Ther
whether the earliest structures foun
from 1637 or from after the fire of 1
present Old Jesuit House must be r
as later still.

Cartier's Wintering Place

The author's final investigation of t
season took place at the junction o
Lairet and St. Charles rivers in Que
City. The purpose of the work was
if possible, the remains of a fort bu
Jacques Cartier during the winter o
36, supposedly at this confluence.

Prior to this, in 1959, the Nationa
Sites Service had employed Kenne
Kidd to search for the fort. Kidd's e
tions were carried out on a strip of
land known as the Townend prope
located on the north bank of the St
River immediately west of the Laire
of the remains uncovered may be p
the 17th-century Jesuit seigneury o
Dame des Anges, but no trace of C
settlement was found. Kidd (1959)
ed that further search for 16th-cen
remains at that spot would prove f

Since nothing had been found o
west side of the Lairet, it was deci
undertake exploratory excavation
east bank. The 1962 work (Rick 19
place on a small area of unbuilt-or
consisting of Cartier-Brebeuf Park

10 Structure 1, uncovered during the 1959 excavations at Cartier-Brebeuf Park, is a well-built foundation wall measuring 17 ft. x 7 ft. and may be the remains of one of the structures associated with the 17th century Jesuit seigneury of Notre Dame des Anges. It bears a striking resemblance to masonry found at Ste. Marie I, a Jesuit site of the same period, both in terms of stone-working techniques and the use of timber as a sill on which to build the masonry superstructure. This use of timber sills was also noted in excavation of the Number 2 Powder Magazine, a 1708 French building at Fort Anne National Historic Park, described in this paper.

adjoining lot to the west. Each of the thirty-five pits dug showed the same stratigraphic sequence, and the pits were so spaced over the park that there can be no doubt that the excavated area is typical of the entire site.

The uppermost stratum in each pit was a foot-thick layer of sandy clay. Artifacts were abundant, but most were obviously 20th century and none appeared to predate the late 19th century. Below the first stratum was a layer of sand followed by a layer of sandy clay; both were water deposited and undisturbed by human activity. One pit was excavated to a depth of 6.2 ft. below surface and a number of others were dug to depths of four or five feet, but no new strata were encountered. No traces of posts were encountered in any of the strata and no artifacts came from below the first level.

It is hardly surprising that no sign of Cartier's fort was found; even if one accepts as fact the belief that he wintered near the junction of the St. Charles and the Lairet, there is absolutely no proof that he built his fort in either of the areas dug. But, had he done so, there could have been only a slight chance that much would have survived in an area that has been the centre of so much human activity for so many years. What is astonishing is that no evidence was found of the shipbuilding and other industries known to have been carried out at this site in more recent times. All traces of pre-20th century activity on the park site have been obliterated.

Montreal City Walls

In 1963, the author briefly excavated in Montreal in response to a request from the City Planning Department for archaeological assistance. In the course of demolishing two buildings, workmen had uncovered walls thought to be those of the 18th century fortifications of the city. One of the walls, paralleling West Commissioner's

Street at the corner of rue St-Sulpice, is somewhat less thick than documents show the city wall to have been. This wall formed one side of the basement of the demolished structure, but had obviously been built at an earlier date and subsequently incorporated into the building. However, construction of, and subsequent additions to, the building had completely destroyed archaeological evidence on one side of the wall, while the other side could not be examined because it underlay the street.

Whether or not this represents the city's fortifications might be determined by documentary research; archaeologically there is no evidence one way or the other. Two other walls, at the corner of Ruelle des Fortifications and St-Gabriel, were found to postdate the construction of the Hôtel de France and, since this had been built about 1818, the walls cannot be part of the city's fortifications.

Villa de la Broquerie

In 1962, Louis A. Chevrette and Christopher J. Turnbull carried out a resistivity survey and brief excavations at the Villa de la Broquerie in Boucherville. This house, also known as Sabrevois Manor, was reputed to have been built by Pierre Boucher in 1668, but subsequent architectural analysis and historical research (Lee 1965a) seem to date the oldest part of the building to about 1735. However, proponents of the antiquity of the house claimed that the latter interpretation was erroneous and asserted that the ruins of a chapel associated with the 1668 construction could be found to the northwest of the present building. The resistivity survey confirmed the existence of masonry remains, but excavations established that these were an integral part of the present house foundations, not a separate chapel as had been supposed. The archaeological evidence, therefore, bolsters the conclusions of the historians that the Villa de la Broquerie is not associated with the house, chapel and redoubt built by Pierre Boucher in 1668 (Chevrette 1965).

Fort Lennox

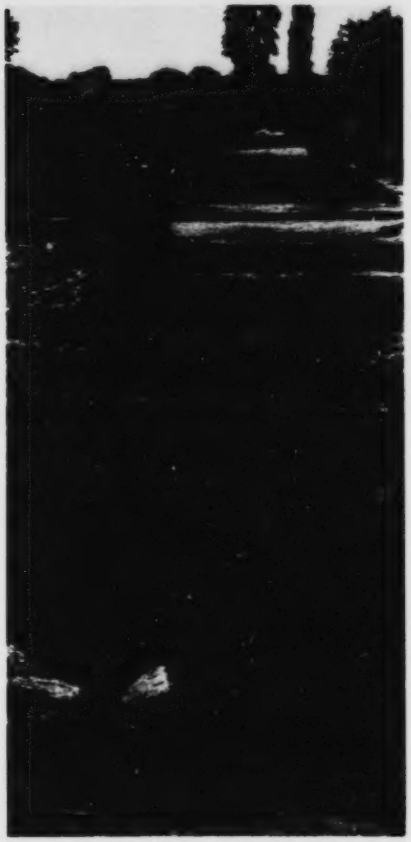
Ile-aux-Noix is a low-lying, 210-acre island in the Richelieu River about ten miles north of the U.S. border. Although Champlain is reputed to have visited the island in 1609, the first recorded settlement was not before 1753. In 1759, the French, having been forced to abandon their Lake Champlain posts, entrenched themselves at Ile-aux-Noix and threw stockades across the river channels to close the passage to the advancing British troops. These fortifications delayed the British attack until August of 1760 when reinforcements arrived. Surrounded on three sides, the French commander embarked the greater part of his forces in canoes and escaped with them to Saint-Jean and Montreal under cover of darkness. The capture of the island was the prelude to the fall of Montreal and the loss of New France.

Subsequently, the island was briefly garrisoned by British troops and, in 1775, was captured and used as a temporary base by invading American forces. The loss of, and the need for defence against, the American colonies emphasized the importance of Ile-aux-Noix in guarding the potential invasion route afforded by the Richelieu River; 1780 marked the beginning of the construction of major fortifications on the island. During the War of 1812, the island became a naval station where small warships were constructed.

The years following this war marked another period of major construction as new fortifications were erected on the south end of the island; the present earthworks and surviving buildings date from this period and the site appears to have been named Fort Lennox about this time. After British troops were withdrawn in 1870, the site was used as a prison and subsequently abandoned until it became a national historic park in 1921 (Lee 1965c).

The first season of archaeological investigations was carried out in 1964 under the direction of Norman F. Barka, assisted by M. Joseph Becker and Ian C. Rodger. Major emphasis was on structures built after the War of 1812; a large hospital and its associated cookhouse and a gun shed were among the buildings excavated. A bakehouse built in 1823 was partially dug and this work was subsequently completed the following season. Extensive excavation was carried out in the area of an 1823 ordnance shed and a large men's barracks which had been built in 1780 and demolished before 1829; no definite trace of the former was found and the latter survived only in the form of two large hearths and some soil stains which may indicate the former position of wooden walls. The search for a lime kiln and a well proved fruitless. Traces of the first British fort were found

11 Excavations on the glacis, Fort Lennox, 1966 season. The exposed logs are pickets from a British redoubt of the 1780s. When this structure was demolished to make way for the present Fort Lennox, the palisades were cut down and thrown into the ditch around the redoubt. This ditch appears to have been part of an earlier French fortification incorporated into the British works.



nder the glacis of the present Fort Lennox, ut much of these early works must have een obliterated during construction of the xisting moat. The considerable amount of verburden in this area slowed down ex- avation, and major work on the British fort ad to be deferred until the following year. ttempts to find the French fortifications ere unsuccessful.

Michael J. Ashworth and Ian C. Rodger ere co-directors of the 1965 excavations, ith Louis A. Chevrette and Judith L. Palas- as assistants. Much of the work was ntered on buildings of the 1812-70 period nd among the structures excavated were e marine barracks, a commissariat, two hipwrights' huts, a stable, a cookhouse nd a civilian hospital which had been con- erted (in 1829) for use as a chapel. Ex- avation of the bakery, which had been artially dug in 1964, was completed. An arthwork, popularly believed to have been dry dock, was tested; it seems improb- le that this construction could have rved its reputed function, a more likely ssibility being that it represents the start a projected, but never completed, new stem of fortifications around the island. Work continued on the first British fort, rt of which had been discovered in 1964 der the present glacis of Fort Lennox. e main part of the excavation in this area s concentrated on a structure tentatively ntified as the mess house, in the cellar which was found a cache of regimental rcelain and glassware. A British redoubt ilt about the same period (i.e., 1780-83) s partially excavated. It had been con- ucted with a double row of masonry for e outer walls, behind which were case- tes of log construction. In the interior of e redoubt was found a well-constructed ainage system probably servicing struc- es built after 1819. The redoubt itself d been demolished to make way for the val yard (Ashworth 1966b).

No trace of French remains were found. e excavations yielded a large quantity artifacts of various kinds, a number of m very closely dated stratigraphically. The final work at Fort Lennox was a two-month season in 1966 directed by Roger T. Grange, Jr., assisted by Marcel Plouffe and John A. Senulis. About a quarter of the 1780s British redoubt and its associated blockhouse had been excavated the previous year; this work was completed by Grange. Work also continued on the first British fort which had been discovered beneath the glacis of the present fort in 1965 and which had been more extensively excavated the following year. The 1966 program uncovered many more structural features of these fortifications including remnants of palisading and pickets *in situ*. When this fort had been levelled to make way for Fort Lennox, the palisade posts had apparently been chopped off and thrown into the original ditch to fill it and many of these timbers have been found, mostly in a good state of preservation. Definite French remains were uncovered in this area and it was established that the first British fort had incorporated portions of the earlier French works.

A mound on the east side of the island was excavated to determine whether or not it was a French blockhouse located in that general part of the Island. The structure uncovered proved to be a rectangular building of timber construction. The large quantity of bottles and the good quality of the earthenware found suggests that this may have been a private residence or a recreational facility of the late 18th or early 19th century. The structure was completely excavated, but a detailed analysis of the artifacts recovered will be necessary before its date and function can be determined with certainty.

On the west side of the island, a rectilinear pattern of surface depressions was investigated to ascertain whether or not this might be the location of the French redoubt, St. Antoine. Upon excavation, the feature proved to consist of drainage ditches and the foundation posts of a small temporary residential structure. American and English coins dating from about 1787 were recovered from this area.

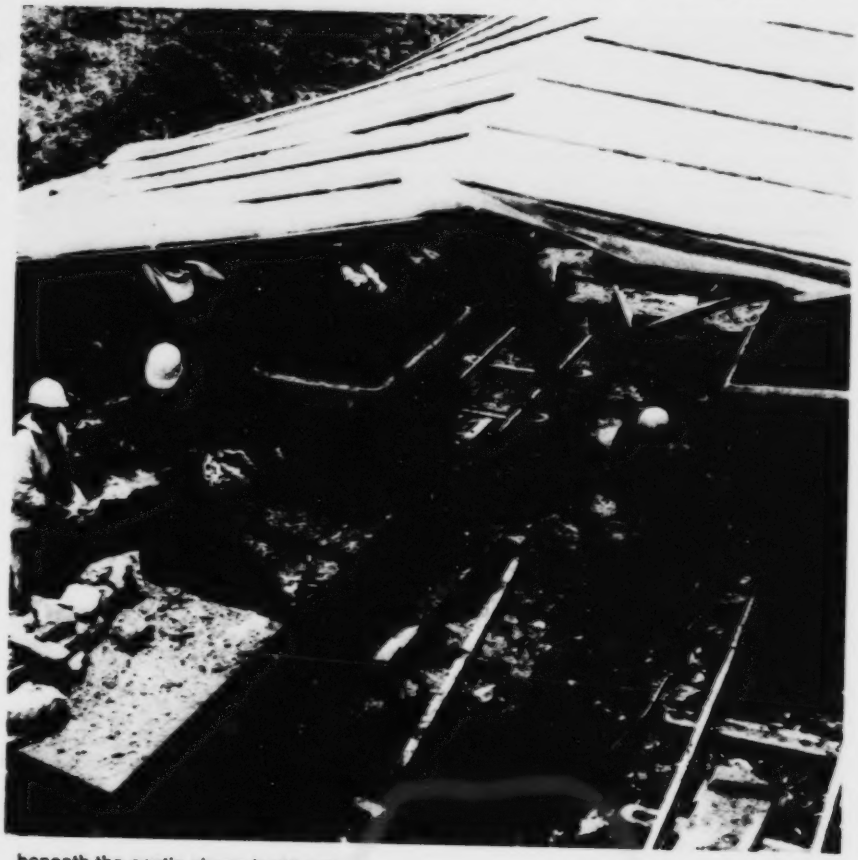
A number of other excavations were carried out in areas where the meagre documentation suggested French structures might have been located. Various architectural features were found, but only extensive analysis will show whether or not these can be dated to the French period. At present, only the work in the area of the first British fort can be said to have definitely revealed traces of the French occupation.

Coteau du Lac

The passage of the St. Lawrence River between Lake Ontario and Montreal is interrupted by three major rapids which exerted a most important influence on transport and communication between Upper and Lower Canada. Of these three, the rapids at Coteau du Lac, near the present city of Valleyfield, were the narrowest and swiftest, and all water traffic was confined to a difficult passage suitable only for small boats, or to a time-consuming overland portage. Towards the end of the 18th century, the economic and political need to foster the development of Upper Canada coincided with the military necessity of supplying the western military outposts against attack from the former British colonies to the south. As a result, Lieutenant William Twiss of the Royal Engineers was commanded to build a fortified canal bypassing the rapids at Coteau du Lac. Work began during the summer of 1779 and, by the autumn of the next year, Twiss had completed a canal with locks, a storehouse and two small blockhouses. Subsequent work included the construction of barracks and stables plus a prisoner-of-war compound on a nearby island. The War of 1812 brought about construction of a substantial fort, the widening and deepening of the canal and the replacement of the lock gates. Except for a brief flurry of activity during the Rebellion of 1837, the post was allowed to gradually decay and, in 1851, the military establishment was abolished. The commercial importance of the canal had also declined following the construction of the Beauharnois Canal in 1842-45 and the increased use of larger steam vessels on the St. Lawrence.

12 Aerial view of the fortifications surrounding the canal at Coteau du Lac. At the left end of the canal may be seen the foundations of one of the early blockhouses built to defend it against American attack. In the right foreground, the unusual cloverleaf bastion juts out onto the rock flats that were once river bottom. The low water level is due to modern dams, but the photograph shows a surviving portion of the rapids which the canal was intended to bypass.

13 An early stage in the excavation of the canal at Coteau du Lac. Much of the reusable stone in the canal walls and the fort buildings was removed for civilian construction following the abandonment of the site. With most of the retaining walls gone, the canal became choked with tons of rock and earth and a mine railway proved to be the only feasible method of removing this. The railway was subsequently employed at Fort Beausejour where the confined space within the walls prevented the use of trucks. Shown in the photograph are the dump cars used to transport earth and one of the flat-bed cars employed in hauling rock.



During the summer of 1965, William J. Folan, assisted by Henry E. Sauerbrunn, directed a three-month excavation program at Coteau du Lac. This was followed, in 1966, by two months of excavation again under the direction of Folan, this time assisted by Roger Marois. These two seasons of work resulted in the complete excavation of the canal and every major building on the site. Some of these buildings, such as the hospital and the combination hospital-master carpenter's shop were built early in the site's history, possibly during the Revolutionary War, and were substantially repaired and converted to new uses during the War of 1812; the hospital, for example, having originally been a storehouse. Many of these older structures were allowed to fall into ruin in the years after the latter war. A good deal of new construction was initiated during the war years and immediately thereafter; much of this gradually decayed, but some structures survived to be sold and moved off the site in 1872. This sale and subsequent removal undoubtedly accounts for the absence of substantial architectural remains in a number of cases where such remains might reasonably have been expected.

The two blockhouses constructed in 1780 at the ends of the canal were excavated as was an unusual octagonal blockhouse designed to hold 200 men; it was built in 1814 and burned in 1837. Other excavated structures include a barracks for 288 men, a powder magazine, a guard house, several warehouses, a church, a bakery, a canteen and various residences such as the commandant's quarters. The prisoner-of-war encampment on nearby Arthur Island was examined, but time and money did not permit extensive excavation of this area.

When Folan departed in June, 1966, in order to direct excavations in British Columbia, his assistant, Roger Marois, remained to excavate a number of gun platforms and to complete the tracing of the system of cobbled roadways which link the various buildings of the post. Marois also excavated two Indian burials, tentatively identified as late Laurentian Archaic, found beneath the post's clover-leaf bastion.

Thousands of artifacts, including a set of lock gates from the canal, have been recovered during the two seasons of excavation. The virtual absence of significant vertical stratigraphy at this site makes it unlikely that these pieces can be dated by stratigraphic means much more closely than the 70-year span of the site. Nevertheless, excellent documentary sources provide a knowledge of the function of each building excavated and should make it possible to relate the artifacts to less tangible cultural manifestations such as social class, use and function.

Fort St. Joseph

In 1963, the University of Toronto accepted a contract to excavate Fort St. Joseph on St. Joseph's Island, near the Sault Ste. Marie, the work to be carried out under the general supervision of J. Norman Emerson. This post had been built by the British as a replacement for Fort Michilimackinac which had been ceded to the Americans following the Treaty of Paris in 1783. The new location was on the direct canoe route from Upper Canada to Lake Superior and may have been the site of an earlier French trading post. A base camp was established in the spring of 1796, but work was not vigourously prosecuted until 1798. By the autumn of 1803, most of the construction was finished. The American post at Michilimackinac remained, however, the chief center of the fur trade in that area and, when it was captured by the British in 1812, the traders and garrison moved there from Fort St. Joseph, leaving only seven men on the island to care for the buildings and the livestock. The British beat off a strong American attack on Michilimackinac in July, 1814, but the American expedition had stopped at St. Joseph's en route and burned this fort, with the exception of the stone magazine, to the ground. The Treaty of Ghent ended the war in December, 1814, and returned Michilimackinac to the United States. The British withdrew temporarily to St. Joseph's Island, using the buildings of the South West Fur Company, and subsequently built their new frontier post ten miles away on Drummond Island. The magazine at Fort St. Joseph remained in use for about ten years serving the new post; however, when a boundary commission decided that Drummond Island was within United States territory, a third post was established (1828) at Penetanguishene and Fort St. Joseph was abandoned.

The 1963 excavations were under the direction of Helen E. Devereux (1965). The following year, a second contract was awarded to the University of Toronto and Michael J. Ashworth (1964) was appointed to direct the excavations under Emerson's supervision.

The above-ground ruins were recorded and the area around the fort, including near-by trading establishments, was surveyed. The majority of the buildings that comprised the military establishment were excavated; these included the blockhouse, the guardhouse, the bakery and a stores building. In addition, a series of trenches determined the location of all of the salient points of the bastions, delineated the lines of the palisade on the four sides of the fort and located the two gates. The effect of the research has been to show Fort St. Joseph as a military-trading complex rather than as a purely military post. Unfortunately, during the period of excavations, time and funds did not permit the adequate exploration of the associated trading establishments. Some 20,000 artifacts were recovered; many of these can be more closely dated than the 30-year span of the site. The artifact discussion in the final report (Emerson, Devereux and Ashworth 1966) is augmented by supplementary reports on the bricks (Swauger 1966) and nails (Dove 1966).

Fort Wellington

During 1965 and 1966, a number of small salvage excavations were carried out at Fort Wellington National Historic Park in Prescott, Ontario. Originally built in 1812, the fort was substantially modified around 1838.

The chief structure within the earthworks is a massive stone blockhouse, fifty feet square, built on the site of an earlier and larger blockhouse. In December, 1965, it was necessary to replace rotted floorboards in one room of the ground floor and, since this presented an excellent opportunity to examine sub-floor features, Karalee A. Coleman was sent to Fort Wellington to excavate the interior of this room. Elizabeth A. Wylie excavated an additional three rooms when more flooring was replaced in October, 1966. Coleman's excavations took place in the former powder magazine; she noted that the space below the floorboards was packed with lumps of charcoal, apparently to absorb moisture. The tongue-in-groove flooring was nailed to the support beams through the tongue so that nails were exposed only on the first and last boards, thereby reducing the possibility of sparks being struck from the metal heads (Coleman 1966). Also discovered were remains of the former blockhouse and a well associated with it (Wylie 1966); this latter feature is scheduled for excavation at a future date.

Brief excavations were carried out in August, 1965, by Louis A. Chevrette, assisted by Paul Villeneuve and Vandra Ward. The work was initiated to determine the cause of ground subsidence in the fort ramparts and excavations revealed the remains of a collapsed timber casemate, probably dating from the original construction in 1812 (Chevrette 1966). Time did not permit complete investigation of this complex area, but more extensive excavations are planned for the future.

Additional excavations at Fort Wellington were carried out during the summer of 1966 by Michael J. Ashworth, assisted by Don Groh. Two gun positions, one at the southeast and the other at the northeast corner of the fort, were dug to provide information for a proposed reconstruction of these positions. In the southeast corner, Ashworth located the pintle and racers of a 24-pounder cannon platform, while the second area yielded remains of a wooden platform for a 12-pounder gun (Ashworth 1966a).

Fort Malden

During the 1966 season, Iain C. Walker, assisted by DiAnn L. Herst, directed salvage excavations at Fort Malden National Historic Park in Amherstburg. A wall of the Hough House, one of the museum buildings at the park, had subsided and, in order to expose the foundations for repairs, it was necessary to trench through an area believed to be the site of an early 19th century guardhouse. The archaeological problem was to excavate the area which would be disturbed by repair work in order to salvage as much information as possible.

Construction started at Fort Malden in 1796. The guardhouse in question was built in 1821, possibly on the site of an earlier blockhouse, and was later modified about 1839. After the fort was converted into a lunatic asylum in 1859, the guardhouse served as a boiler-room for the newly-built, immediately adjacent laundry. This laundry was turned into a planing mill in 1875, and then was remodelled as a private house, the present Hough House museum, in 1921-22. At this latter date, the guardhouse was demolished and replaced by a sun porch.

In view of this complex sequence of buildings and modifications, and considering the limited extent of trenching permitted by the salvage nature of the work, it is hardly surprising that the confusing array of walls exposed is proving difficult to relate to the historical sequence. The subsidence of the Hough House wall, which necessitated the repairs and the excavations, proved to be caused by the fact that the house foundations had been built on an unconsolidated mass of collapsed brick, apparently connected with the 1821 guardhouse or, rather, with its modification from a wooden structure to a brick building sometime before 1839. While some of the other structural remains can be placed in sequence relative to each other and to this brick wall, their functions remain obscure. The problem is additionally complicated by the lack of datable artifacts. Analysis has not yet been completed, but it seems likely that the Malden investigations have raised a number of architectural problems which must remain unanswered until further excavations enable these isolated data to be placed in some sort of larger context.

Dollier and Galinée Wintering Place

Walker's second excavation of the season took place at Port Dover on Lake Erie; he was assisted by Elizabeth A. Wylie and Herst. The first known Europeans in this area were two French priests, Dollier and Galinée, who spent the winter of 1669-70 near the confluence of an unnamed river with Lake Erie. The identification of the present site on Black Creek as being the wintering place is not convincing and excavations were carried out to determine whether or not 17th-century European remains could be found on the supposed campsite.

One reason for identifying the Black Creek site as the Dollier-Galinée wintering place was the presence there of two low mounds, one circular and the other a hollow square. Excavation revealed these features to have been man-made, but their purpose remains unknown. The surrounding land was thoroughly trenched confirming that the rest of the area had been a marshy estuary and would have been an unlikely spot for anyone to have settled on. No positive evidence was found to authenticate the site and a fair amount of indirect evidence can be adduced to suggest that the original identification is erroneous. Nevertheless, historical evidence leaves little doubt that the actual site was somewhere in the general area.

Rainy River Burial Mounds

The remaining two excavations in Ontario during the 1966 season were carried out at the request of the Historic Sites and Monuments Board of Canada. The first of these consisted of the investigation of one of a group of burial mounds (the Armstrong Mounds) which stretches for about a mile and a half along the Long Sault Rapids on Rainy River. The purpose of the excavation was to verify the nature of the mounds and to establish age and cultural affiliation so as to provide the Board with sufficient information to determine whether or not the site should be commemorated. A contract was awarded to the University of Toronto which appointed Walter Kenyon of the Royal Ontario Museum to direct the work. Kenyon excavated one mound 80 ft. in diameter and 8 ft. high and reports (Kenyon 1966) the discovery of several secondary burials painted with powdered hematite. A wood sample from the logs delimiting the burials has been submitted to the National Museum of Canada for radiocarbon dating. Kenyon associates the mound with the Laurel Tradition and tentatively dates the burials to some 2,000 years ago.

Cahiagué

The Historic Sites and Monuments Board of Canada also requested archaeological investigations as an aid in establishing the location of Cahiagué, a Huron village visited by Champlain in 1615. McIlwraith (1946) and Emerson (1964) equate Cahiagué with the Warminster Site, a large, palisaded, contact-period Huron village near Orillia. Proof of identity rests largely on the determination of the actual size of the Warminster village site, since size is one of the few features commented on by Champlain. In 1966, a contract was awarded to the University of Toronto to cover part of the costs of tracing the palisade in an attempt to establish the area enclosed, and, hence, the possible number of longhouses contained therein. The excavations were directed by Conrad Heidenreich, assisted by Allan Tyyska, and under the general supervision of J. N. Emerson.

Previous work at Warminster (Emerson 1965) had established two distinct house types and had resulted in extensive excavation of the palisade at the west end of the village. The 1966 program revealed "that the area under investigation is separated into two clearly demarcated areas, each strongly palisaded, and these are in turn separated by an area of sterile ground" (Emerson 1966: 2). The obvious question is whether or not these two segments are contemporaneous and constitute a single settlement divided on, say, a clan basis. Midden areas were excavated in both segments of the site and it is hoped that artifact analysis will clarify the temporal relationship between the two parts.

Lower Fort Garry

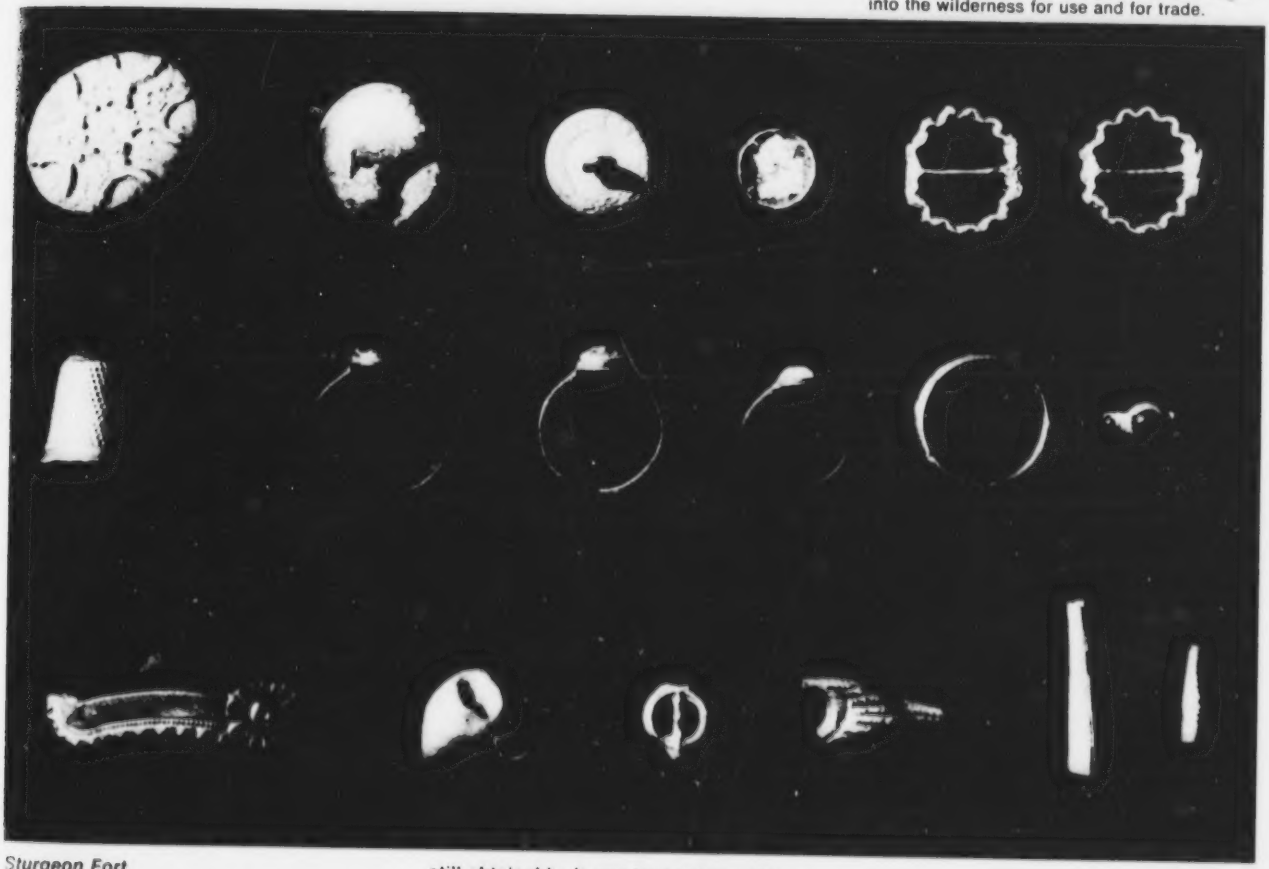
In 1965, the University of Manitoba accepted a two-year contract to carry out excavations at Lower Fort Garry National Historic Park near Selkirk under the general supervision of William J. Mayer-Oakes. The University employed James V. Chism to direct the project; he was assisted by Peter Priess and William H. Morgan during the first excavation season and by Priess and Virginia Gerelus during the second season.

The stone fort was built in 1831 by George Simpson, Governor of the Hudson's Bay Company's Northern Department. Simpson intended this new post to replace the flood-damaged, original Fort Garry located some twenty miles away at the forks of the Red and the Assiniboine rivers. The new site was in a better location from the standpoint of flood control and Simpson hoped to make it a centre for agricultural development and a shipping depot for the export of tallow, wool, flax and hemp. However, the Forks was the point where the agricultural economy along the Red River converged with the fur trade of the west and Simpson's new post was too far off the beaten track to stand by itself. In 1835, the original fort (Upper Fort Garry) was rebuilt on higher ground to combat the floods and from then on Lower Fort Garry functioned mainly as a supplementary post. It ceased operations as a trading post in 1911 (Miquelon 1964).

In a field north of the fort enclosure, two 30 ft. x 60 ft. barns were excavated. One of these, presumably the horse stables, had been a two-storey building with an elaborate two-layered rubble and cut-stone floor. The second building, an ox stable, had walls of rubble and mortar fill between closely set vertical logs resting on a stone foundation. South of the fort, excavations uncovered two superimposed blacksmith shops utilizing the same stone forge. Partially excavated was a malt house which had later become part of a sawmill-grist mill complex; construction appears to be of the same rubble-filled post style as was found in the ox stable. The miller's house, a small log structure, was excavated, as was a lime kiln built into a ravine bank. Sections of the gravelled roadway have been traced throughout the site. A number of midden areas have been tested and unsuccessful searches were made for the boatyard and the stableman's residence. Within the fort walls, a storehouse was excavated and the prison pickets exposed; this latter feature dates from 1870 when part of Lower Fort Garry was used as a provincial penitentiary. A troop canteen from the same period was also dug. A number of minor excavations were carried out around the Factor's Residence to provide architectural information for the current restoration of this structure. Various test trenches were dug throughout the site to salvage archaeological information prior to the construction of park buildings, water lines, etc. (Chism 1965; Chism et al. 1967).

14 Salvage excavations around the Factor's Residence at Lower Fort Garry. For purposes of stabilization, the foundations of the "Big House" had to be exposed and archaeologists from the University of Manitoba, excavating in another part of the fort, were called in to record information that would otherwise have been destroyed. This typifies the many minor archaeological problems which arise in the management of a nation-wide system of historic sites.

15 Some trade goods were recovered from the 1962 excavations at Sturgeon Fort, an 18th-century trading post in Saskatchewan. Erosion had destroyed much of the site so that the architectural details recovered were relatively few, but the artifacts (including a large collection of trade beads) depict the range of items brought into the wilderness for use and for trade.



Sturgeon Fort

The only contract awarded during the 1962 season went to the Saskatchewan Museum of Natural History to excavate Sturgeon Fort, some three miles west of Prince Albert, Saskatchewan. This site, the first fur trading post on the North Saskatchewan River, was occupied from 1776 to 1780 by a group of independent traders who had organized themselves into a pool. Norman F. Barka was employed by the Museum to direct the excavation project. The fort had been subjected to heavy erosion by the river and the 1962 excavations were intended to salvage such information as was still obtainable. It was found that, unfortunately, much of the site had already been washed away so that comparatively little in the way of structural data was obtained. However, the work yielded a small, but closely dated, collection of the manufactured items brought into the wilderness by the traders (Barka 1966a).

Among the artifacts recovered by Barka were over 2,000 trade beads comprising 80 different varieties. This collection was further augmented during the summer of 1966 by Terrence W. Foster's excavation of a cache pit which erosion had uncovered in the river bank (Foster 1966).

16 After the Blackfoot forced the abandonment of the first Rocky Mountain House in 1861, a new post with the same name was built about one-half mile downstream in 1866. This was in turn abandoned in 1875 and the photograph shows its ruins from the south side of the North Saskatchewan River in 1886.

Rocky Mountain House

In 1861, the first post at Rocky Mountain House was abandoned because of increasing friction between the Hudson's Bay Company employees there and the Blackfoot Indians in whose territory the post had been built. This withdrawal provided no lasting solution since the Blackfoot were then forced to travel to Fort Edmonton to trade. There they encountered the more numerous Cree and the resulting strife added to the difficulties of the Edmonton traders. As a result, the Company decided to resume trading at Rocky Mountain House and, in 1865, construction started on a new post half a mile downstream. Work was seriously delayed due to crop failures and shortages of game animals so that it was probably not much before 1869 that Rocky Mountain House II was finally occupied. The new fort, never a great economic success, was abandoned in 1875 in favour of a post at Calgary and the remains were destroyed by fire in 1882 (Lee 1965b).

In 1966, a contract was awarded to the University of Calgary to carry out excavations at Rocky Mountain House II and the university appointed Claude A. Vaucher to direct the project. The site is located on the north bank of the North Saskatchewan River some three miles southwest of the town of Rocky Mountain House. The immediate need for the excavation was the threat of river erosion which had already destroyed the east palisade and bastions.

Four major buildings and two bastions were located and tested. The location and construction details of the palisade were determined and the north and west gates were excavated. The area enclosed by the palisade, about 220 ft. x 440 ft., was double that which had been expected and it would appear that the southern half had been a garden or corral. Sampling of the features was sufficient to provide a clear understanding of the construction and layout of the post. Excavation has borne out the accuracy, even to details, of a surviving sketch of the site made in 1873. Artifacts were relatively few and these are currently under study (Vaucher 1966).

17 Excavation of the stratified shell midden underlying the Nootkan village of Yuquot. Comparatively few traces were found of the 18-century Spanish occupation despite extensive trenching among the houses of the present-day village of Friendly Cove and on nearby San Miguel Island. The midden proved to be about 18 ft. in depth and yielded an excellent sample of pre-contact Nootkan artifacts.

Yuquot

In 1778, Captain James Cook visited the Nootkan Indian village of Yuquot on Nootka Sound on the west coast of Vancouver Island. Finding the natives hospitable, he named the cove on which their village was situated "Friendly Cove." It was not, however, until 1788 that a European, John Meares, settled at Friendly Cove. He built a small dwelling and a shipyard from which he launched the schooner *Northwest America*. His activities in the area were cut short by the arrival of Esteban José Martinez who seized several vessels for illegally participating in the sea otter trade in Spanish territory. To reinforce their territorial claims, the Spanish built a small battery on the nearby island of San Miguel and constructed a hospital, bakery, two carpenter's shops and other buildings on the shores of Friendly Cove.

Since this site represents the most northerly extension of Spanish settlement on the west coast of North America, it was felt that archaeological investigation might yield interesting data on the adaptation of the Spanish to a northern climate. Moreover, the six-year span of Spanish occupation would mean a closely dated collection of artifacts for comparative purposes. Consequently, on completion of his work at Coteau du Lac in June, 1966, William J. Folan began excavations at Friendly Cove; his senior assistant was John T. Dewhirst.

Extensive trenching on San Miguel Island failed to reveal substantial traces of the battery or any significant amount of Spanish artifacts. The search for other Spanish structures was hampered by the fact that the present-day village of Friendly Cove is built on top of the Spanish site. Nevertheless, by placing trenches in the open spaces between houses, it was possible to excavate some of the areas where documentary evidence suggested Spanish buildings had been located. A number of artifacts of European manufacture were found, but there was little trace of Spanish structural remains; however, the quantity of bone points and harpoon barbs that were uncovered suggested that the village was built on a large midden and subsequent excavation revealed midden deposits 18 ft. deep. These yielded an excellent collection of pre-contact Nootkan artifacts including a few zoomorphic figures carved from ivory and stone. A number of Nootkan songs were recorded, among them one describing the Spanish occupation.

A brief survey carried out in the vicinity of Friendly Cove revealed nine additional sites, mostly identified by their shell mounds.

18 In 1964, the remains of a bateau were raised from the waters of Georgian Bay near Fort St. Joseph. The bottom and parts of the frame were all that were left of this 23-ft. boat, tentatively dated to the early 19th century.

Richelieu River

The Service's initial underwater work was carried out by Sean Gilmore and Walter Zacharchuk in the area around Fort Lennox during the summer of 1964. Primarily this was designed to test equipment and to determine what information might reasonably be expected from submarine excavations and what types of problems were likely to be encountered. Test excavations were carried out on a coal barge sunk about the turn of the century at Cantic some five miles upstream from the fort.

The following year, Gilmore carried out underwater surveys on the shores of Ile-aux-Noix in an attempt to locate and date dock construction there (Gilmore 1965).

Gulf of St. Lawrence

In 1965, Zacharchuk directed an extensive underwater survey in the vicinity of Egg Island on the north shore of the Gulf of St. Lawrence. The purpose of this work was to locate and determine the condition of the wrecks of the Hovenden-Walker expedition of 1711. This fleet had been on its way to attack Quebec when eight vessels went aground in a storm; five of the wrecks were located by Zacharchuk. Since these are in relatively shallow water, they have all been severely damaged by wave and ice action. The remains are encased in a very hard conglomerate of sand and boulders from which the few artifacts recovered had to be removed with chisels. Glass and pottery have been heavily scoured by sand. Most of the iron objects have corroded away, but it is possible to obtain impressions of some of these pieces by pouring plaster into the holes which they once occupied in the matrix. Those iron artifacts which survive require immediate conservation since they crumble after a few days of exposure to air.

These wrecks might repay further investigation, but this could be done only at great expense. Removing artifacts from the matrix would be a time consuming job and diving would be hampered by the frequent storms and fog in this area. For much of the summer, the coldness of the water

would also reduce diving time unless dry suits were worn. Extensive laboratory facilities for prompt treatment of the artifacts would be a necessary part of any investigation of these wrecks.

Four additional wrecks were discovered in this area. One dates from the 1920s and the second from the mid-19th century. The remaining two were not sufficiently exposed to permit any estimate of date.

Lake Ontario

Beginning in the late spring of 1966, Zacharchuk carried out a reconnaissance of the eastern end of Lake Ontario and the St. Lawrence River down to Gananoque. A large number of wrecks was located and it was decided to confine further investigations that summer to this area.

The first site examined was wreckage off Burnt Island, near Gananoque, Ontario, believed by local divers to be the remains of early trade canoes. Although this site had been picked over by divers for several years, many artifacts were recovered, chiefly clay pipes and pane glass. Five kegs of cut nails, each weighing 250 lbs., were found; two of these were salvaged. Documentary research suggests that this material was cargo which had been jettisoned after a collision between two ships on 24 August 1856.

The second site was off Main Duck Island in Lake Ontario, about 22 miles south-southwest of Kingston, Ontario. The primary objective was to locate and excavate a French military vessel which had sunk off the island in 1741 while on its way from Cataraqui (present-day Kingston) to Fort Niagara with trade goods and military supplies. A large quantity of 18th-century material was recovered from cracks in the limestone slabs which form the lake bottom in this area, but no trace of the ship itself was found. The evidence suggests that the vessel ran aground in a storm and could not be refloated because of damage to the hull by the rocks; some of the cargo may have been salvaged by the survivors. When the ice moved out in early spring, it probably carried the hulk with it, at the same time scattering the unsalvaged cargo over a wide expanse of lake bottom. In subsequent years, the ice presumably swept the material into cracks in the rocks where it was found.

R. K. Leishman, a Kingston diver, reported a wreck in Patterson Bay near Mallorytown Landing, Ontario, and this was examined on completion of the Main Duck Island project. The wreck was completely sand-covered except for the stem, centre board case and stem post. Because of the shallow water, it was not possible to use air-lifts and, consequently, the sand had to be raised by a slower, water-powered suction device; it was necessary to remove some 320 cubic yards of sand to bare the hull for recording. The craft is 54 ft. long and 14 ft. abeam; its general appearance and architectural details suggest a military supply ship of the 1810-20 period. Most of the few artifacts recovered seem to support this date, although the maker's mark on one pipe stem suggests a later period. It is hoped that current documentary research will provide sufficient information to identify the wreck. Architecturally, the vessel seems sufficiently interesting to justify raising it for further study and eventual exhibition and it is expected that this work will be carried out during the summer of 1967.

To the extent that time permitted, Zacharchuk examined a dozen other wrecks in the river and eastern end of the lake. Most of these, unfortunately, were found to have been stripped by divers.

Georgian Bay

Gilmore and Zacharchuk conducted a brief survey at Fort St. Joseph in 1964 to locate submerged dock installations connected with the military establishment there. Remains of the schooner dock were found and several mounds of stone, believed to be cribs for the fort's canoe docks, were also discovered. A few days of work were devoted to excavating and raising a 23 ft. bateau, tentatively dated to the period of the War of 1812 (Gilmore and Zacharchuk 1964). The craft was treated with polyethylene glycol and is now on display at Fort Malden.

During the autumn of 1966, Zacharchuk and the author visited Meldrum Bay on Manitoulin Island to examine a wreck reputed to be that of La Salle's *Griffon* which disappeared somewhere between Green Bay, Michigan and Niagara Falls in 1679. Quimby (1966, Ch. 4) suggests that the ship went down in northern Lake Michigan; certainly there is no reason to believe that she ever reached Manitoulin Island. The Meldrum Bay wreckage appears to be the side of a ship and examination of the nails recovered indicates a post-1820 construction date (Mercer 1951: Fig. 207; Fontana et al. 1962: 44 ff.). There is no possibility that these nails were made in the 17th century and, hence, the wreckage cannot be that of the *Griffon*.

Resistivity Survey

During the summer of 1964, the University of Pennsylvania Museum's Applied Science Center for Archaeology conducted tests at Fort Lennox of the Geohm resistivity meter and the proton magnetometer. Elizabeth K. Ralph, Associate Director of the Center, and Hugh Bergh were in charge of this project. Results with the latter instrument were unrewarding, but the Geohm meter proved highly successful in locating buried structures (Rainey and Ralph 1966).

The following year, Albert E. Wilson carried out further Geohm tests in Newfoundland and Nova Scotia. The Fort Lennox work had demonstrated the efficiency of the meter on shallowly buried masonry in sandy soil and the Newfoundland sites were chosen because of the radically different conditions prevailing there. At both Castle Graves and Signal Hill, bedrock is very close to ground surface and the masonry structures are frequently built directly on bedrock. The tests at Castle Graves were unsuccessful, partly because the masonry remains were not massive enough to give meter readings which would distinguish them from bedrock. Furthermore, the fortifications occupy the entire hilltop and it was not possible to move outside the fort area to obtain "background" readings against which the surveys over areas of masonry could be compared. The Signal Hill tests were also unsuccessful, in this case, primarily because the overburden was so full of broken rock that no clear resistance patterns could be established. The final tests were carried out at Fort Anne where soil conditions are similar to those at Fort Lennox, but where the masonry remains are generally buried several feet deeper. The results here were very rewarding with many clear and easily interpretable resistance patterns emerging (Wilson 1965).

While the results of two seasons of testing show some of the limitations of resistivity surveys, they also indicate the usefulness of these instruments in the investigation of archaeological sites. This is particularly true of historic sites where the comparison of documentary evidence with resistance patterns will frequently permit scientific identification of buried structures. Admittedly, field operation can be slow, but, as a means of determining where to dig and what is likely to be found, the resistivity survey can represent a substantial savings in time and money over test trenching.

Archaeological Training Program

The simultaneous development of archaeological research programs by the National Historic Sites Service and the Fortress of Louisbourg Restoration Section created a new demand for experienced field assistants which existing university training resources were able to fill only in part. Moreover, a number of students trained on small, unstratified prehistoric sites found some difficulty in adjusting to the problems of supervising labour crews and recording complex stratigraphy and architectural features. As a result, the Service has, for the past four years, conducted a summer training program in archaeological field techniques. The primary goal has been to create a body of trained students available for subsequent summer employment by the Service as field assistants. It is expected that the students selected will obtain the requisite theoretical background in their regular university courses and, for this reason, selection is almost entirely limited to those majoring in history or anthropology. This has the added advantage of introducing prospective historians to the applications of archaeology to their discipline and of perhaps convincing anthropology students that excavation experience gained on large, stratified historic sites is also applicable to smaller, prehistoric excavations.

Two basic teaching approaches have been tried: on-the-job training and training in a formal field school situation with lectures, examinations, etc. The drawback to the former approach is that problems are dictated by the work situation and not by teaching requirements; hence, pressures of work may force students to spend an excessive amount of time on one aspect of excavation to the exclusion of necessary experience in other phases of the work. In the formal school situation, this problem is largely eliminated because one can select for excavation areas which provide a broad range of typical field problems. One obvious drawback is that the field school is an artificial environment which may or may not approximate the "real" excavation situation and this is recognized by, and reflected in the attitudes of, the students. More importantly, the training function can only be incidental to the main work of the National Historic Sites Service and this precludes the field school approach except under certain conditions such as existed at Fort Lennox in 1964 and 1965. Here, the site development problems were such that excavating any of a wide variety of areas was likely to produce useful information and the development schedule permitted a pace of excavation which could be geared to student needs. Completion of this phase of the work at Fort Lennox dictated a return to on-the-job training methods in 1966.

Over the past four seasons, both approaches have produced comparable numbers of good students. While the field school students may finish their initial summer with a somewhat broader knowledge than the others, the differences tend to be minimal by the end of the second season in the field. Since on-the-job training seems more compatible with the Service's basic role, it is likely that this system will continue in use as long as it is considered necessary to carry on the training program.

With this issue, the National and Historic Parks Branch inaugurates its new publication series. Primarily, this is designed as an outlet for historical and archaeological research carried out by the National Historic Sites Service and the Fortress of Louisbourg Restoration Section, although papers from other sources may be considered if space permits.

The present paper is intended to show the scope of the Service's archaeological research and to bridge, in summary fashion, the gap between research and publication. The bibliography which follows lists most of the unpublished archaeological reports now on file with the Service and thereby indicates the contents of future volumes in this series. It is expected that subsequent issues will appear in print as frequently as reports can be made ready for publication and funds are available.

Publication date is, to some extent, reflected in the foregoing discussion of individual sites. By and large, projects, such as Fort Beausejour, which are a long way from completion are discussed in greater detail than excavations which have been finished and for which reports are being prepared for publication. A number of minor projects are discussed at length because it is unlikely that reports on such work will ever see print. These excavations were designed to answer specific questions and do not, in themselves, represent integrated, publishable units of a site. At such time as major excavations of these sites are carried out, these isolated units will be integrated into the broader studies.

The minor excavations result from a need to supply archaeological answers to a wide variety of specific questions relating to landscaping, small restoration projects, preliminary site development planning, etc. Much of the work is done to salvage information threatened by maintenance or development projects such as sewage systems and underground wiring. These matters demand the attention of any body administering a nation-wide network of sites, no matter how frustrating such piecemeal excavation may be to the individual archaeologist. Excavations of this type will always be part of the Service's responsibilities, but, as more site development plans are formulated, it becomes increasingly possible to incorporate these small projects into integrated research programs for entire sites.

The number of undeveloped sites in the national historic park system has been a major factor in determining the orientation of the Service's research program. It is the Service's responsibility for site development which has constituted the basic "problem orientation" of research, rather than any explicit formulation of archaeological problems. In effect, archaeology has been used to find out as much as possible about the physical appearance of various sites in order to enable the Service as a whole to determine whether it should plan for reconstruction, restoration, stabilization or some other form of site development. This type of applied research for immediate results will remain an integral part of the Service's work, but this research has itself resulted in the formulation of new problems, particularly in the field of artifact analysis, which future excavation must take into account. The next few years must see a program of basic research designed to solve these problems in conjunction with a continuing program of applied research to meet immediate needs.

Unless otherwise stated, all titles referred to below are unpublished manuscripts on file with the National Historic Sites Service, Department of Indian Affairs and Northern Development, in Ottawa.

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1964
Fort St. Joseph, St. Joseph's Island, Ontario. Preliminary Report, 1964 Season. 110 p.
1966a
Excavation of Two Gun Platforms at Fort Wellington, Prescott, Ontario. 8 p. (Pl. I-VIII)
1966b
Fort Lennox, Ile-aux Noix, Preliminary Report, 1965. 111 p. (3 maps attached)

Barka, Norman F.
1965
Historic Sites Archaeology at Portland Point, New Brunswick, Canada – 1631-ca. 1850 A.D. Unpublished dissertation, Harvard University. 623 p. (Pl. 1-265; 3 maps attached)
1966a
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1966b
The Excavation of the La Coupe Site, a Probable Dry Dock in Eastern New Brunswick, Canada. 51 p. (Pl. 1-25)

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Caywood, Louis R.
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Chevrette, Louis A.
1965
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1966
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. . . , and others
1967
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1965
Underwater Work: Search for and Excavation of Wharf Locations, Richelieu River, 1965. 5 p. (Fig. i-ii)

. . . , and Walter Zacharchuk
1964
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Four Thousand Years of History: the Story of Archaeological Excavation at Portland Point, Saint John, New Brunswick. *The*

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965
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939
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1967
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A Report on the Excavation of an Historic Site at the Junction of the St. Charles and Lairet Rivers, in Quebec City. 57 p.

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1965b
Rocky Mountain House. 8 p. (9 maps attached)
1965c
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Chignecto Dry Dock: An Undescribed French Dock-like Structure on the La Coupe River. *Transactions of the Royal Society of Canada, Third Series, Section II,* Vol. 27, pp. 87-95.

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Wylie, Elizabeth A.
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Jelks, E. (3); Rick, J. (4, 9); Public Archives of Canada (5); Swannack, J. (6); Barka, N. (7, 15); Herst, D. (8); Kidd, K. (10); Grange, R. (11); Zacharchuk, W. (13, 18); Chism, J. (14); Geological Survey of Canada (16); Folan, M. (17).

A Classification System for Glass Beads
for the Use of Field Archaeologists

Abstract

As a result of examination of numerous collections of glass beads in northeastern North America and elsewhere, and as a result of a study of the procedures used in their manufacture, the authors propose a classification and nomenclature which they hope will permit exact descriptions and a reference base for all beads found in archaeological excavations. New bead types may be added to the system which is expansible to accommodate all possible variations.

Preface

Archaeologists working on sites occupied after the arrival of Europeans in northeastern North America, and indeed in other parts of the continent, frequently encounter glass beads. Describing these beads has proven to be frustrating for most archaeologists, involving the making of fine distinctions as to colour, size, shape and other characteristics between many similar specimens. To date, there has been no completely satisfactory frame of reference, such as has been available in other branches of archaeology, e.g., ceramics. Many classification systems have been set up, but none has proven very useful under field or laboratory conditions, and none has found wide acceptance – a necessary factor if there is to be ready comparison of finds from different sites. It is with some temerity, therefore, that the authors venture to submit one more system of classification to the archaeological community. They do so in the hope that it may be of practical use to those who feel the need of a new system.

Acknowledgements

Research work for this paper was first begun under a John Simon Guggenheim Fellowship which the senior author held in 1951-52 for the general study of trade goods among the American Indians of the Northeast. He was later assisted by a grant from the Corning Museum of Glass, given for the study of glass beads in the same area, and by aid toward clerical assistance from the Canada Council. To each of these agencies he wishes to acknowledge a deep debt of gratitude, for without such help the study could not have been carried to completion.

At the outset, virtually all of the important collections, both in private hands and in public museums in the Northeast, were examined by both authors, notes made upon individual specimens, and numerous photographs and drawings made. At later dates, collections in British and European museums were examined, a visit made to the glassworks at Murano, Italy, and archival and library research carried out.

Both authors wish to thank all those who made their collections available for study. Their names are many, and it would be impossible to list them all here, but special thanks are due to one of them, Mr. Charles F. Wray, of West Rush, New York. Mr. Wray not only made his extensive bead collection available to us for study, but also loaned us the specimens which appear on the cover. His interest in the subject and generosity in imparting his hard-won knowledge greatly enhanced the value of the research.

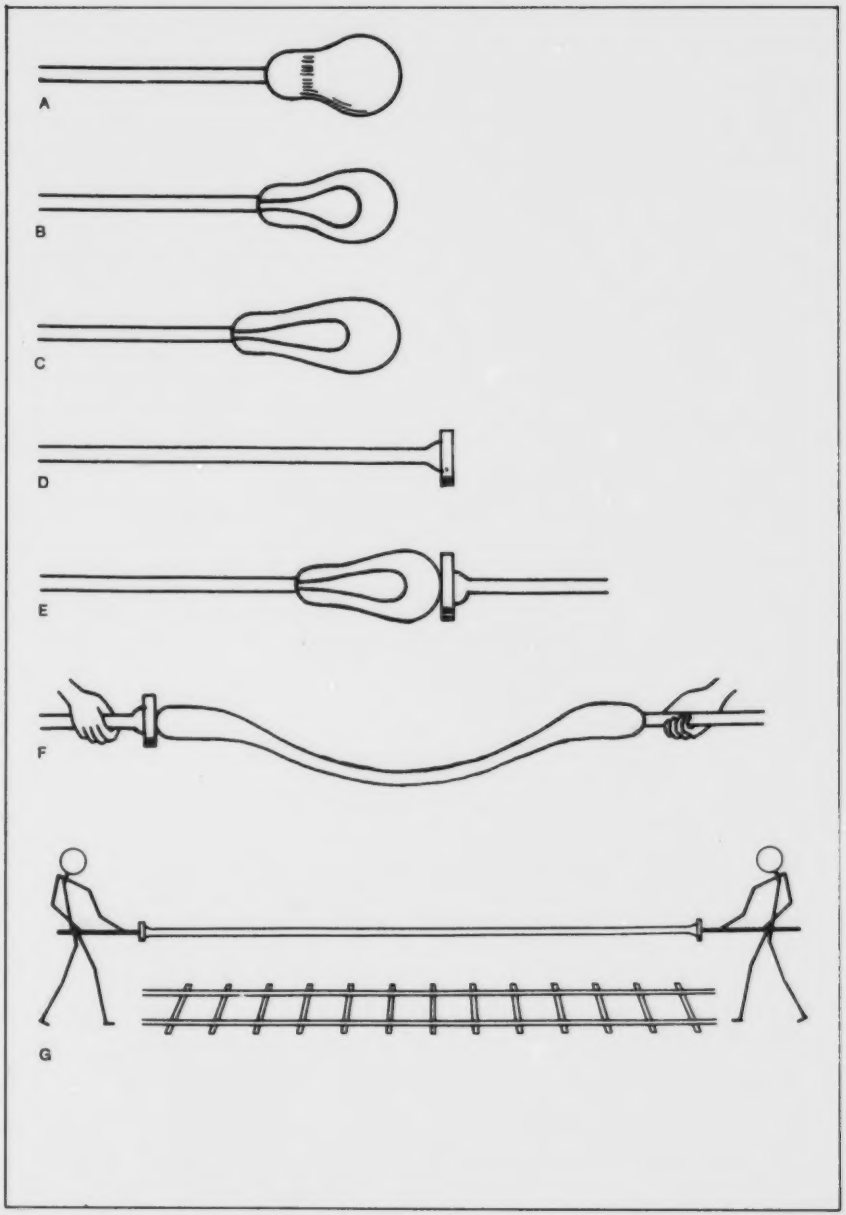
To Dr. Paul N. Perrot, Director of the Corning Museum of Glass, special thanks are due for encouragement and sound advice. The authors wish to emphasize, however, that they alone are responsible for whatever shortcomings the paper may have, as well as for any errors which may occur.

This paper is part of a much more comprehensive investigation on the study of glass beads used for trade with the Indians of northeastern North America. Basic to such a study is the need for a satisfactory terminology and the authors, not finding one ready at hand, decided to try to work one out. After accomplishing this to their satisfaction, they decided not to await the publication of the larger work, but to make the results available to any who might wish to use it. It should be stressed, however, that our firsthand knowledge has been confined largely to specimens from the Northeast, and while the classification scheme should be of worldwide application, our specific knowledge does not extend to all of North America, and there may be many types which we have not seen.

There have always been, of course, terms by which the different kinds of beads have been known and identified. Some of them have referred, however vaguely, to physical characteristics; in this category we would place such terms as "pound," "seed" and "tube." Others, derived from sources now often obscure, are "macca," "cornaline" and "rosetta." None of these has any precise significance, and although they may be useful in the trade, are of no assistance to the archaeologist. The use of such terms as "pony" and "Russian" beads, seemingly not used extensively by dealers but rather by the consumer and by students, are equally valueless. In the Old World, individual types of beads were often called by specific names, but these likewise have no classificatory use. Within the present century, several systems have been devised for bead classification, but so far as the authors are aware, none will permit the identification of each and every glass bead known. The one proposed here will, it is hoped, make good that deficiency, or at least pave the way. It is based on the firsthand study of approximately 500 different types, and has been designed to be infinitely extensible.

This classification is based, in the first instance, upon the processes of manufacture; in the second, upon such physical

1 Drawing a tube for glass beads.



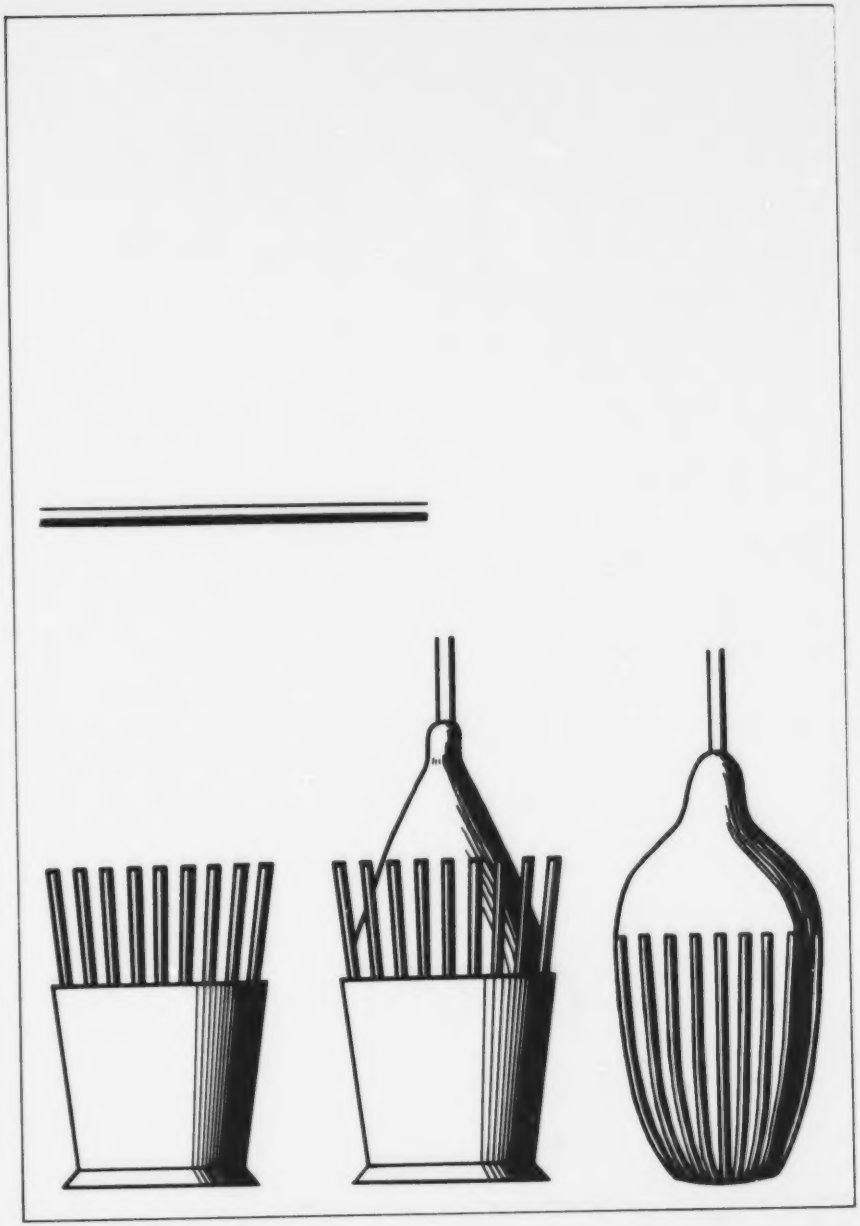
2 Inlay treatment for glass beads.

characteristics as shape, size and colour (including translucency and opacity). The last class of attributes encompasses verifiable entities, for it is possible to subject any given specimen to an examination with regard to them, and to compare said specimen with any other bead with respect to each. Processes of manufacture can also be determined by inspection. It should not be inferred from these remarks that the authors imply any sort of evolutionary development in the making of beads, but it is difficult, nevertheless, to see how some of the procedures used could have come into being except through some developmental process such as is outlined below.

The manufacture of glass beads will be discussed more fully in the book which is in preparation: but in order to understand the function of the classificatory system under discussion, it is necessary to have at least some understanding of how beads are made. To this end, the following extremely brief and condensed synopsis of the various processes is given.

Glass, a complicated substance made from silica, an alkali, a stabilizer and (usually) a colouring agent, is molten when raised to a high temperature, and solid at room temperature. In the molten state it is highly ductile, and while cooling can be manipulated into a vast variety of forms by using appropriate techniques. Beads may be made by two principle methods: (1) by drawing out a bubble of molten or viscid glass into a long, slender tube, and (2) by winding threads of molten glass around a wire which is later withdrawn. A third method, probably often used in conjunction with each of the above, is by molding the beads in two-part molds while the glass is still viscid.

The first method of bead manufacture requires the services of two men (Fig. 1). The first man gathers up a small amount of molten glass on the end of his blowing rod, and by blowing into the rod enlarges it to a bubble. He then puts the bubble into the mass of molten glass to gather up more material. At this time, he may either add more glass of the same colour or glass of



different colour from another pot. If a ifferent colour is added, the process is alled "layering." Two or more colours may e used, and even five or six layers of ifferent colours are not uncommon. If a mple round tube is required, the second an attaches another iron rod to the far nd of the glass bubble, the blower hands is end to a servant and both these men nen move in opposite directions until the lass becomes cool and will not pull out urther. (In practice, neither of the runners, *r tiradors*, is the same man as he who withdraws the glass from the furnace and blows it.) The now rigid tube of glass is laid down on slabs of wood to cool (Fig. 1). When it has cooled sufficiently, it is broken up into short lengths, and these are finally chopped into sizes which will serve as beads. It is necessary to note that during the process of drawing, the proportions at any given point along the length of the tube remain constant. This means that the bore is almost uniform throughout, but it becomes smaller and smaller the more slender the tube becomes. We now have cylindrical beads either of monochrome or polychrome glass, depending upon whether one or more layers have been given to the bubble.

Other treatments than that described above may be given to the bubble. The first of these is the so-called inlay treatment, where "canes" or rods of coloured glass re affixed to it, ultimately producing striped eads. In this process, rods of the required olour are ranged around the inside wall f a pail-like container (Fig. 2). These rods ay be themselves either simple or multi-e. The bubble is introduced into the cen-e of the bucket and expanded sufficiently cause the rods to adhere, whereupon it re-introduced to the furnace just long nough to cause the rods to coalesce with e surface of the bubble, but not to lose eir form. The bubble is then drawn as escribed above and the resulting tube ears the diminutive remains of the rods n its surface.

Another treatment may be given on the marver," or board. The bubble, whether it layered, unlayered, striped, or a combination of these, is laid on the marver, and either flattened slightly, or paddled to make it triangular, square or some other shape in cross-section. If a corrugated marver is used, the bubble is rolled over it to press the corrugations into the sides. The bubble is then drawn in the usual way, and the finished tube will retain the shape, though not the dimensions given it on the marver. (Generally, when the bubble is rolled on the corrugated marver, it is layered in glass of another colour, and the process is repeated until five or six layers, and in some cases up to twelve, have been built up before it is drawn. The resulting bead is the so-called rosetta, star, or chevron.)

While the tube is being drawn, it may also be twisted. This applies not only to simple monochrome tubes drawn from the bubble as blown, but to layered, inset and marvered beads as well; thus it is possible, and indeed it happens, that one finds such complicated forms as beads which have been layered, striped, squared in section, and twisted.

Some beads, especially large ones, like big chevrons, are often ground at the ends and for a short distance along the sides in order to bring out the colour effects in the layering. Most, however, are not given this rather costly treatment.

Imperfectly shaped beads are not uncommon on Indian sites, and their classification poses a slight problem. Even twinned beads sometimes occur. Generally the intended form is easy to see and they are classified accordingly. It would appear that the Indians were not very critical: in fact, one gets the impression that they actually preferred these eccentric specimens.

The diameter of the finished product will depend entirely on the extent to which the bubble has been elongated; it may vary from an eighth of an inch or less to an inch or even more. When the tubes have cooled, they are broken into long pieces which can later be chopped on a block to the desired length; that is, anywhere from a sixteenth of an inch or thereabouts to three or four inches. They may either be left in this condition, or they may be subjected to further treatment to reduce them to oval or rounded beads.

To effect this shaping, a mixture of ground charcoal and fine sand is worked into the orifices of the beads, and the whole is then placed in a metal container and re-subjected to heat. In order to keep the beads from fusing together while in this heated condition, the container is constantly agitated on an eccentric axle. This action, in conjunction with the heat, reduces the beads to a round shape, while the mixture of sand and charcoal prevents them from sticking together and the orifices from disappearing. When cool, the beads are separated from the mixture, washed, and then agitated for some time in bags of bran to produce a polished surface.

Whether left in tube form or made into round beads, the finished products are sorted, first on a set of sieves of graded sizes, and finally by hand, during which defective examples are removed. They are then strung into hanks, but nowadays this is less often done than packaging in bulk, in which form they are ready for shipment.

Whereas tube beads are mass produced in the sense that thousands may be made from a single bubble or gathering of glass (which, however, is individually fabricated), wire wound beads are made one by one. Wire which has been covered with chalk, or some similar substance to facilitate removal of the final product, is heated at a flame (originally fed by whale oil) and at the same time a cane or solid rod of glass, about as thick as a lead pencil, is heated and a thread started from it. This thread or strand of molten glass, which may be of any colour, is wound around the wire until a bead of the desired size and shape is built up. Indeed, threads of different colours may be introduced to make multicoloured beads; and glass insets of various kinds, such as simple dots, rosettes, or flowers, may be set into the matrix while it is still soft. Such beads, often called *suppialume*, are capable of almost infinite variation and attempts to classify them are consequently no more successful than other individually made, handcrafted products.

Although little is known of the process, it is quite apparent that in the past some beads were molded, and it seems safe to assume that this was accomplished in conjunction with the processes outlined above for the making of both tube and wire wound beads. Certainly there are many examples of beads which have been pinched in two-part molds; the so-called "raspberries," "melons," and facetted types being examples of such molded beads.

There is no problem, obviously, in determining when a bead has been molded, but it is not always quite so easy to decide whether a given specimen has been produced by the drawing method or by wire winding. Close inspection with a hand lens will usually reveal this, however, for in the former, the fibres of glass are arranged side by side longitudinally. This is often more clearly shown in tubular beads which have lain in the soil long enough to disintegrate slightly, at which stage the fibres show up quite clearly. In wire wound beads the fibres are arranged in heliacal fashion, round and round the circumference of the specimen. Such an arrangement is often obvious in the so-called milk glass beads. But perhaps of even greater help in deciding the method of manufacture is the presence of small air bubbles. In both processes, these tiny inclusions of air are bound to occur, and it is seldom that inspection will fail to reveal them. In the case of tube beads, little bubbles, like the fibres of glass, have been drawn out into long, thin shapes, a sure indication of the method used to make them. Just as certainly in the case of wire wound beads, the bubbles are either globular or oval and never elongated.

During the 17th, 18th and 19th centuries, the control of the ingredients was a somewhat haphazard affair for the exact science of chemistry had not yet arisen. The materials which went into the manufacture of glass depended on many variables, but chiefly upon the judgement of the man in charge. It is true that the proportions of the various ingredients which made glass of certain qualities was recognized and followed; but it is equally true that they were not accurately controlled. (A modern analogy would be with a cook who does not follow her recipe exactly in making a cake, but uses her experience and judgement.) Furthermore, the ingredients which went into the glass batch were not chemically pure resulting in considerable variation in the quality of the finished product, some being less stable than others, and so on.

This matter of chemical variation is especially important with regard to colour. It was well understood that certain materials, like copper salts, would produce specific colours; and this knowledge was fully utilized and expanded with increasing experience. But again the colouring chemical was not pure, and slight variations in colour inevitably resulted. Furthermore, the resulting colour could be affected by the nature of the batch into which the chemical was introduced; and if the batch were not uniform in all cases, colour variations could result no matter how pure the pigments were nor how accurately they were measured. All told, therefore, there is room for considerable variation in colour, and 18th century and earlier beads differ considerably in this regard from those made in the 19th and 20th centuries when strict standarization became the rule. In brief, one cannot expect to find consistency of colouring in these early beads; but on the other hand, one does find a rainbow range of beautiful soft colours, very different from the harsh, strident ones so frequently encountered in the modern product.

The Tube Bead Chart

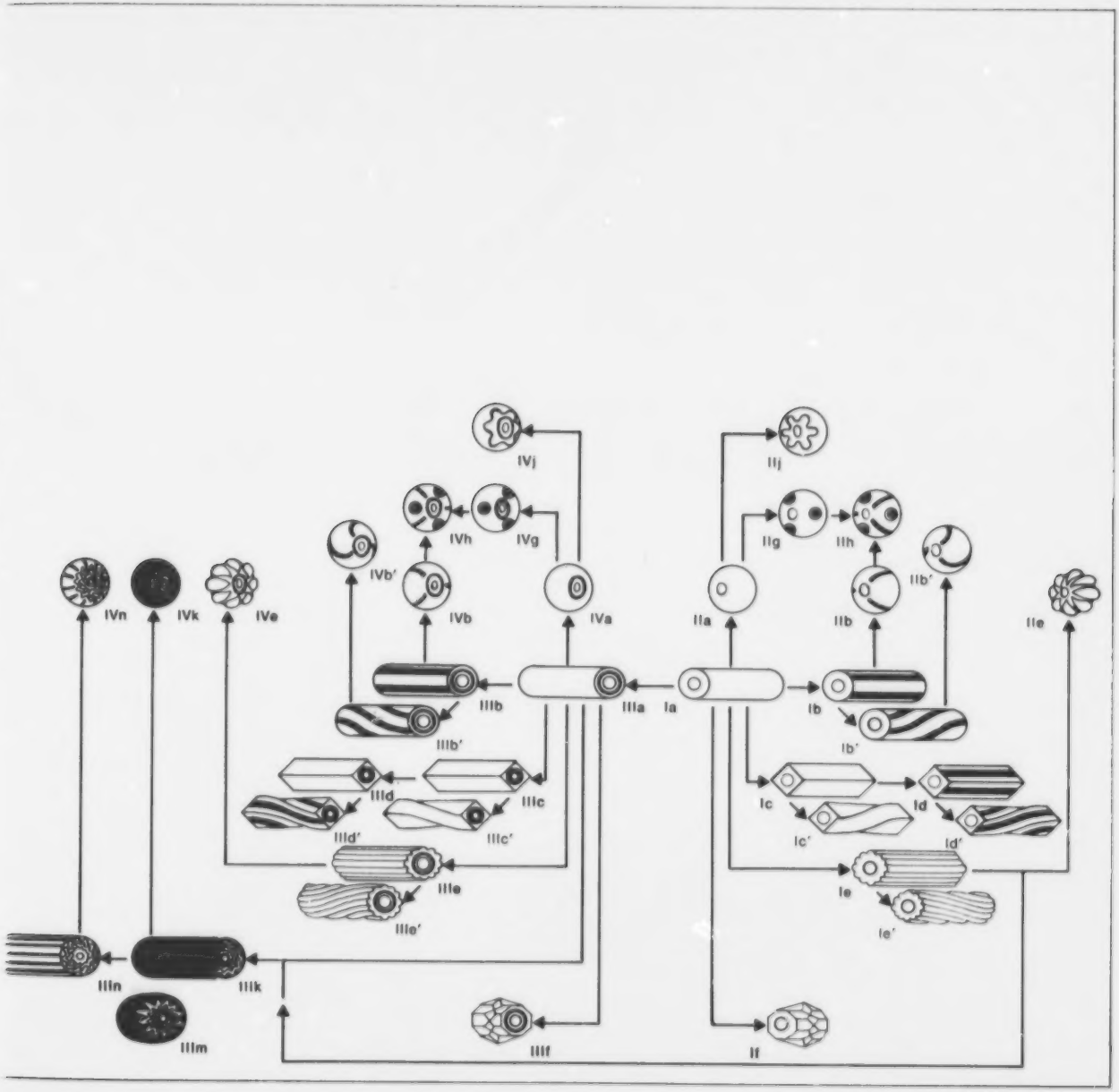
The chart (Fig. 3) illustrating tube beads is divided into four quadrants. Contiguous quadrants can be described as units in themselves but this cannot be done with non-contiguous quadrants. The beads in the lower quadrants (I and III) are all basically tube forms; those in the upper quadrants (II and IV) have been modified to a round form by re-heating. Furthermore, the beads in quadrants I and II are "simple beads"; that is, they are basically monochrome but may have adventitious surface decoration; but those in the two left hand quadrants (III and IV) repeat the classes covered in I and II but are layered, and may therefore be regarded as compound and not simple. The one exception is the class of star beads which is not duplicated in the right quadrant. The chart is not strictly symmetrical because types corresponding to some that appear are hardly conceivable. For instance, there are innumerable beads of the types Id and Id', but their counterparts in quadrant II do not seem possible. The same is true for quadrants III and IV, but the numbers are available for use if the need should arise. All the beads assigned to a quadrant bear the designator for that quadrant (i.e., I, II, III, IV).

It cannot be emphasized too strongly that this chart shows only the most elementary of the possible forms. Examination of the plates will reveal something of the degree of possible elaboration of these basic types.

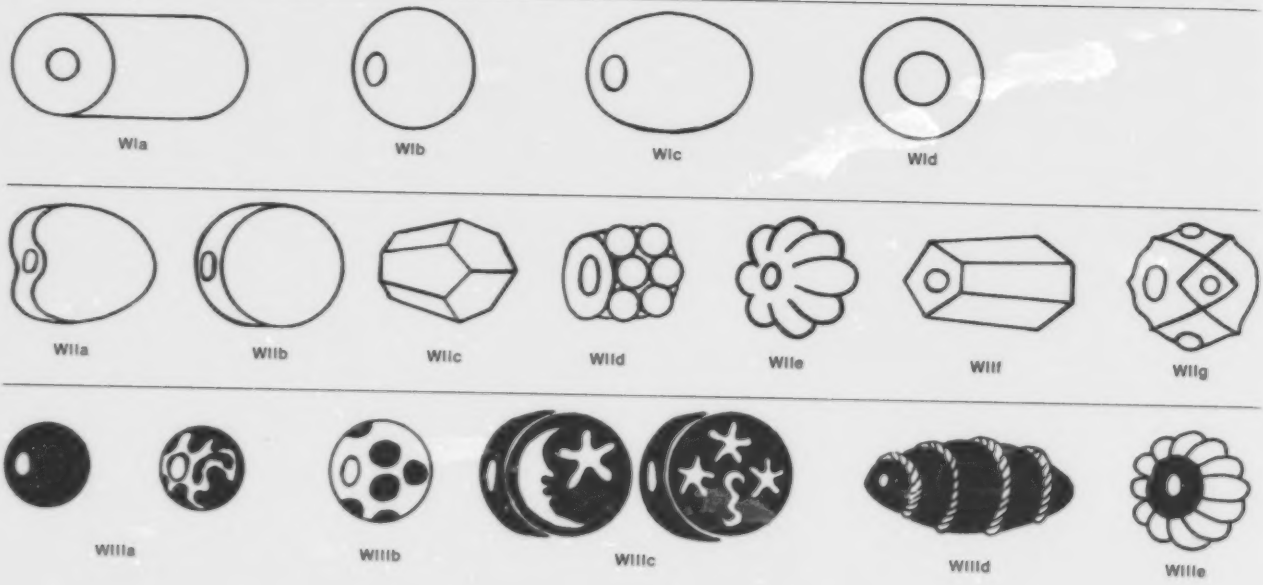
Class I

All the beads in quadrant I are designated as Tube Beads, Class I (*see* Fig. 5). They are simple monochromes with, in some cases, adventitious surface decoration. Bead Ia is the simplest possible monochrome tube. Bead Ib is made by adding simple or compound stripes of a different colour before drawing to a gathering similar to that from which Ia was made. Bead Ib' was made like Ib except that in drawing it was twisted. Bead Ic is made from a simple gathering which has been squared in section before drawing. Bead Ic' is like Ic

aster identification chart for tube beads.



4 Master identification chart for wire wound beads.



ɔut has been twisted in drawing. The same ɔbservations apply to Id and Id′ as to Ib ɔnd Ib′. Bead Ie is made from a gather- ɔng which has been shaped to a ridged ɔorm before drawing, while Ie′ is the same which has been twisted in drawing. Bead If ɔs a section of tube whose surface has been ɔodified into facets by grinding.

Class II

Beads in the second quadrant are designated as Tube Beads, Class II (*see* Figs. 6 and 7). Basically, all are theoretically, and probably in practice, derived from Class I types. The essential difference is that, instead of being left in the tube shape, they have been subjected to rounding by re-heating (as previously described). The simplest form is, of course, Bead IIa, which is derived from Ia by re-heating and tumbling the latter until it assumes the round form. Similarly, IIb derives from Ib, IIb′ from Ib′ and IIe from Ie. Bead IIg is a derivative of IIa, to which round insets or "eyes" have been added, while IIh is a combination of IIb and IIg. Bead IIj is like bead IIa with the addition of two or more wavy lines of a different colour in which the waves may be parallel, crossed or spiralled.

Class III

Beads in the third quadrant are designated as Tube Beads, Class III (*see* Fig. 7). With the exception of the star beads (IIIm and IIIn), all the beads in this quadrant have analogies in quadrant I, the essential difference being that, whereas the latter are made from the monochrome gathering, those in quadrant III are made from a two- or multilayered gathering. The star beads have up to seven layers of glass, each with twelve ridges, and each alternate layer consisting of an opaque white glass. Bead IIIk is a simple star tube; IIIm is derived from IIIk by grinding down the ends to show the internal design (and is the true star bead); IIIn is similar to IIIk with the addition of three stripes not unlike those in the "b" varieties.

Class IV

Beads in the fourth quadrant of the first chart are designated as Tube Beads, Class IV (*see* Fig. 8). They derive from the Class III beads in a fashion parallel to the derivation of Class II beads from Class I beads, and are, like the Class III beads, rounded by re-heating. The two beads IVk and IVn have no analogies in the second quadrant, for they are derived from IIIk and IIIn by re-heating.

There are two special cases in the classification of tube beads which require explanation. The first is that in which compound stripes occur. It will be recalled that beads with simple stripes are classed as Ib, IIb, IIIb, and IVb. Similar beads with compound stripes are designated as Ibb, IIbb, and IIIbb and IVbb respectively. The second exception, including beads which look like inferior imitations of the bead IVn, is designated as IVnn.

The Wire Wound Bead Chart

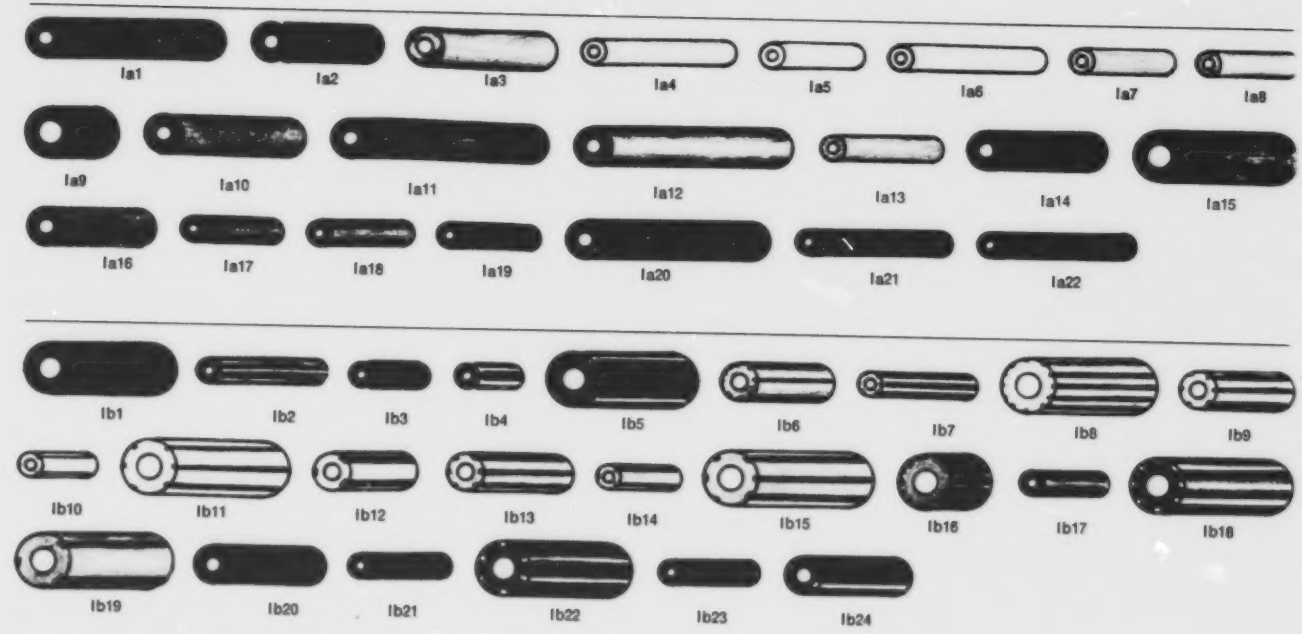
Because they are handcrafted, it is impossible to reduce wire wound beads to a neat classification, but for ease in reference, they have been divided into three groups. All wire wound bead designations are prefaced by the letter W (*see* Figs. 4 and 9). Group WI comprises beads of simple shapes; i.e., tube, round, oval and doughnut. They are all monochrome. Beads of Group WII are also monochrome but are more elaborately shaped, either by pinching, molding or some other form of manipulation. The so-called "corn" beads, disc, facetted, raspberry, melon and odd-shaped forms occur in this group. Group WIII beads are beads of any of the above shapes which are not monochrome, and which may, and often do, have adventitious surface decorations of contrasting colours.

The numbering system has had to be rather more arbitrary than in the case of the tube beads where some systematic developmental order could be discerned. Hence, the following arrangement is presented as covering more or less adequately the contingencies encountered in this class.

Tubular forms are designated as WIa, round as WIb, oval as WIc and doughnut-shaped beads as WId. The beads of the second group are subdivided as follows: flattened corn-shaped beads, WIIa; disc beads, WIIb; facetted beads, WIIc; raspberry beads, WIId; melon beads, WIIe; cog-shaped or multilateral beads, WIIf; and beads with a pressed design, WIIg.

WIII beads may be any wire wound bead with additional decoration which may be superimposed on or inlaid in the metal. Thus bead WIb, with a surface coating of a different colour or material, becomes WIIIa; WIb with an inlaid decoration becomes WIIIb; WIIb with an inlaid decoration becomes WIIIc; WIc with a spiral overlaid decoration becomes WIIId; and WIIc with a coating of a different material or colour becomes WIIIe.

The taxonomic system outlined above is based essentially on such characteristics as are observable by visual inspection; the only mechanical aids which might be required would be a low-powered hand lens and a millimetre rule. It has not been within the authors' means to employ complicated laboratory tests to determine the chemical nature of the beads concerned, nor is the field archaeologist likely to have either this laboratory equipment or the background training to use it. His determinations will be, for the most part, empirical. The very simplicity makes the system more useful than would be the case if such devices as spectrographic analysis were an integral part. Certainly the desirability of such analyses can not be denied, however. It is greatly to be hoped that in the near future the means and the facilities for carrying out laboratory analyses of beads will be available. When this becomes possible, the inadequacies (and no doubt the errors) of the present system will be smoothed out and it will become more reliable. But till that happy day arrives, perhaps the system suggested here will serve a useful purpose and make the field archaeologist's task a little easier.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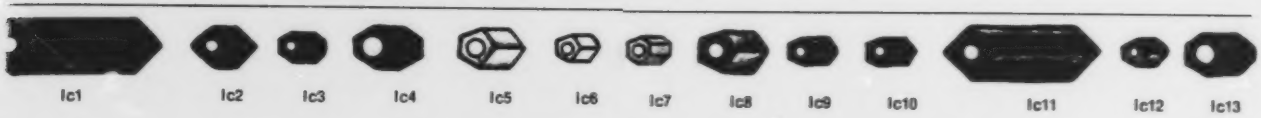
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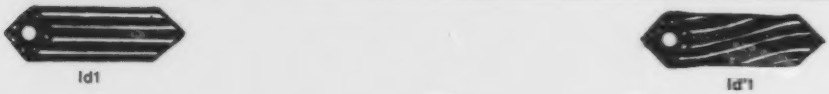
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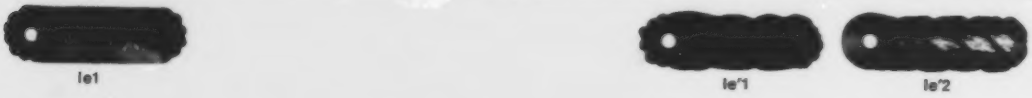
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Ie'2

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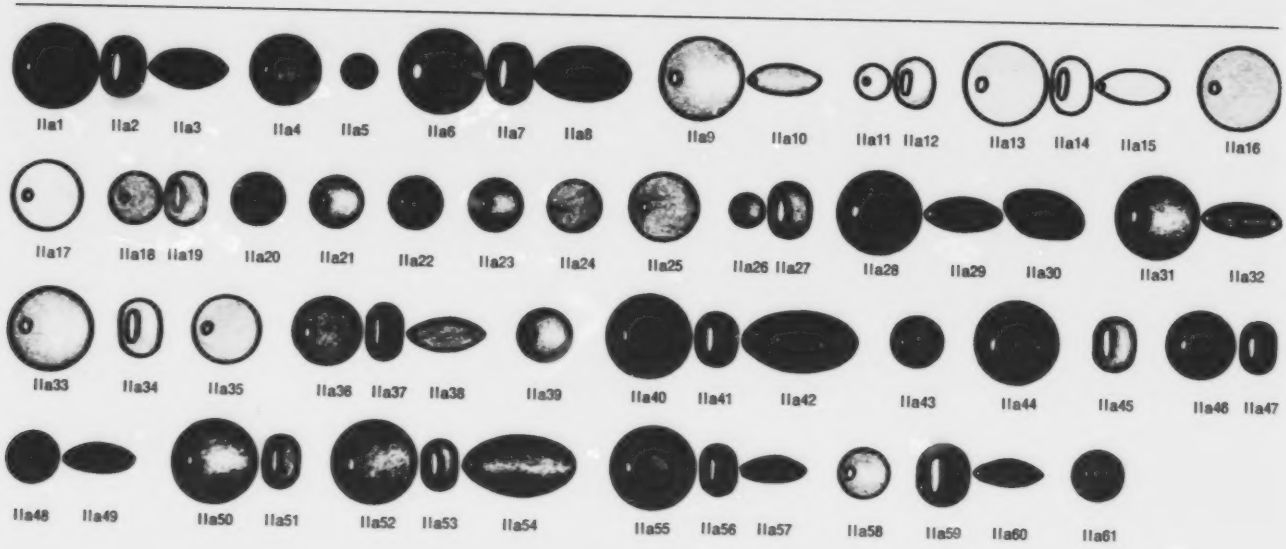
If2
If3
If4
If5

6 Colour plate II.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IIa33 IIa34 IIa35 IIa36 IIa37 IIa38 IIa39 IIa40 IIa41 IIa42 IIa43 IIa44 IIa45 IIa46 IIa47
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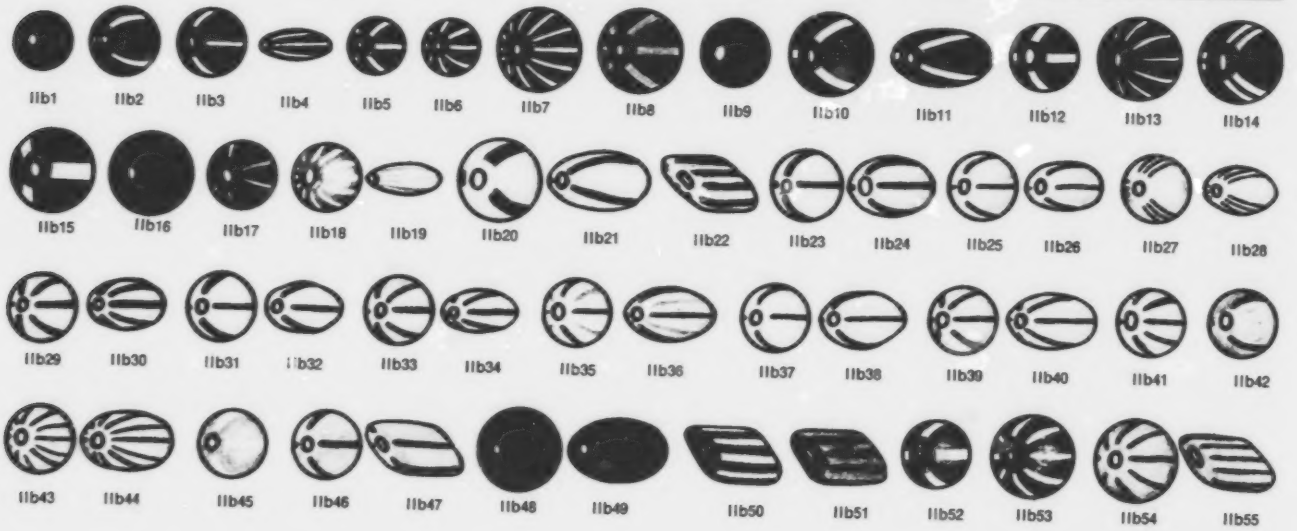
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IIb29 IIb30 IIb31 IIb32 IIb33 IIb34 IIb35 IIb36 IIb37 IIb38 IIb39 IIb40 IIb41 IIb42
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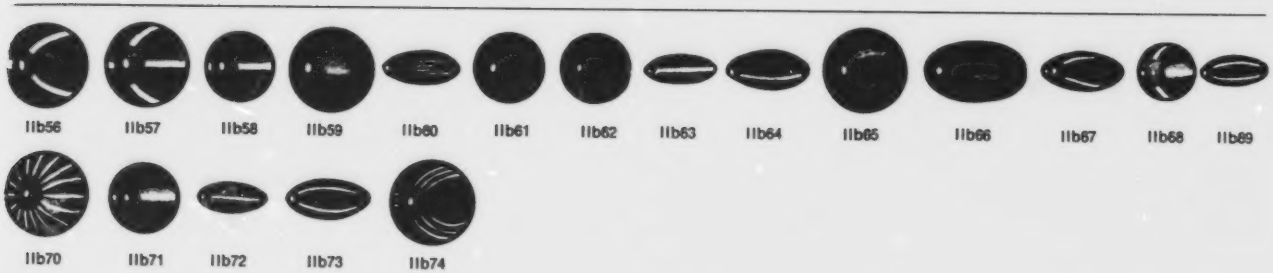
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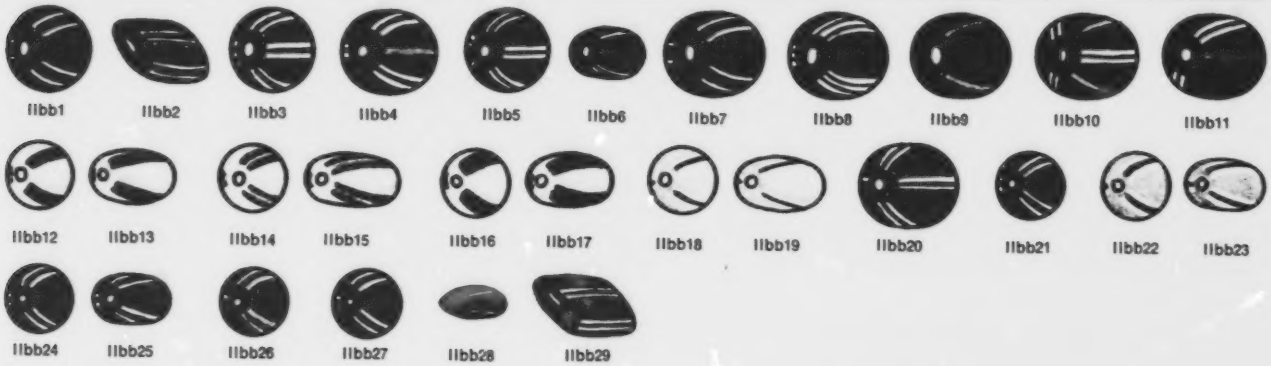
IIb74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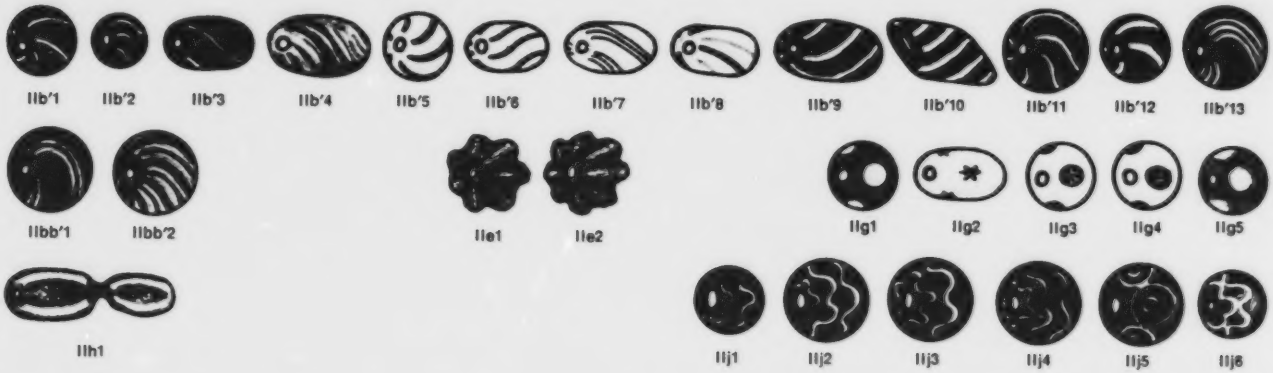
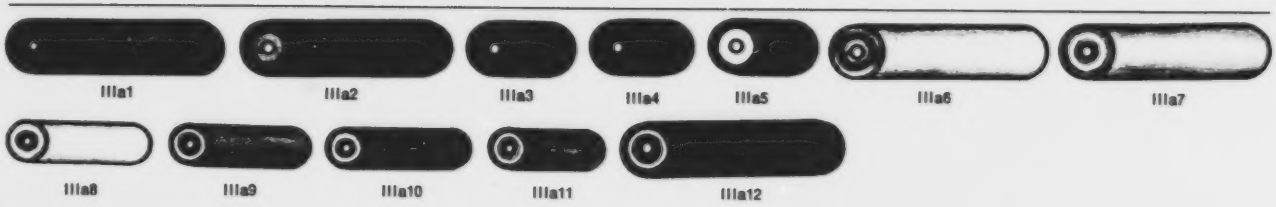
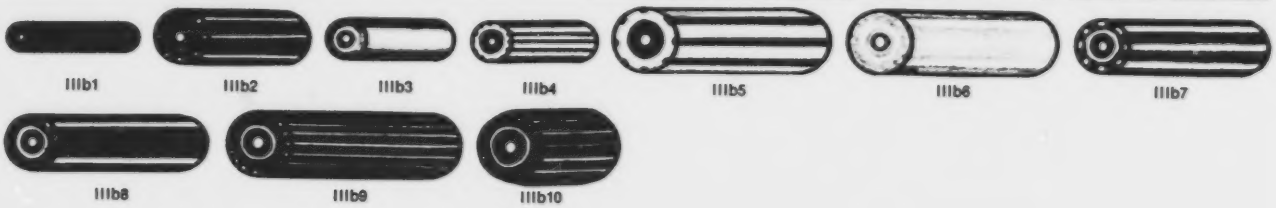
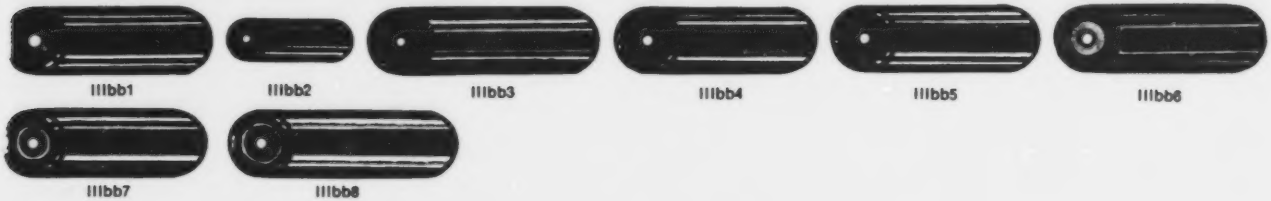
7 Colour plate III.





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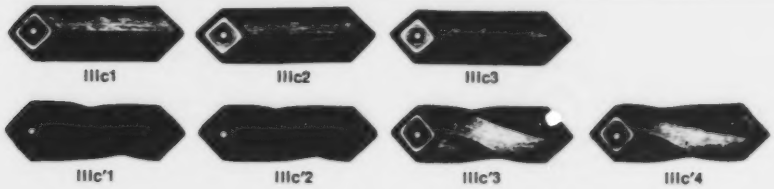
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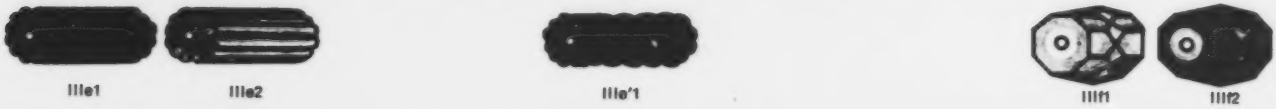
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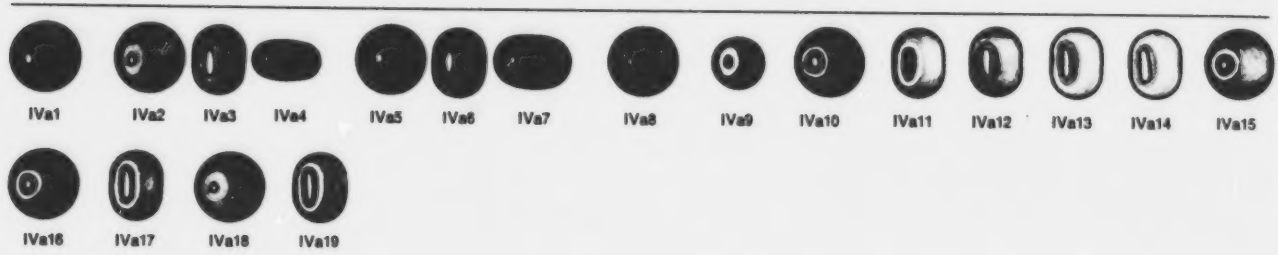
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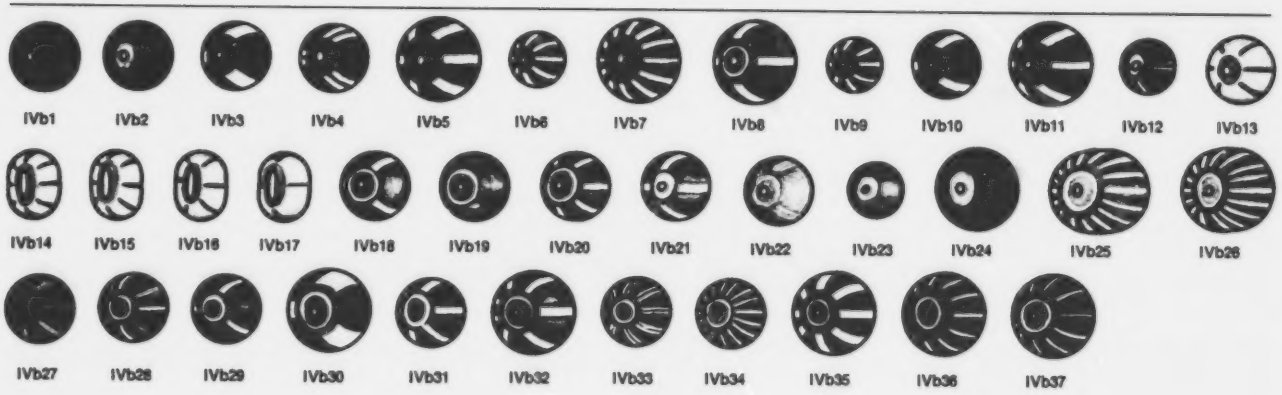
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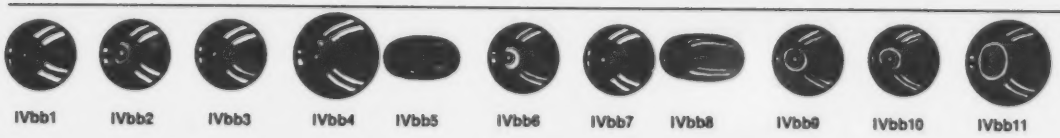
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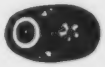
IVb'1

IVbb'1



IVg1

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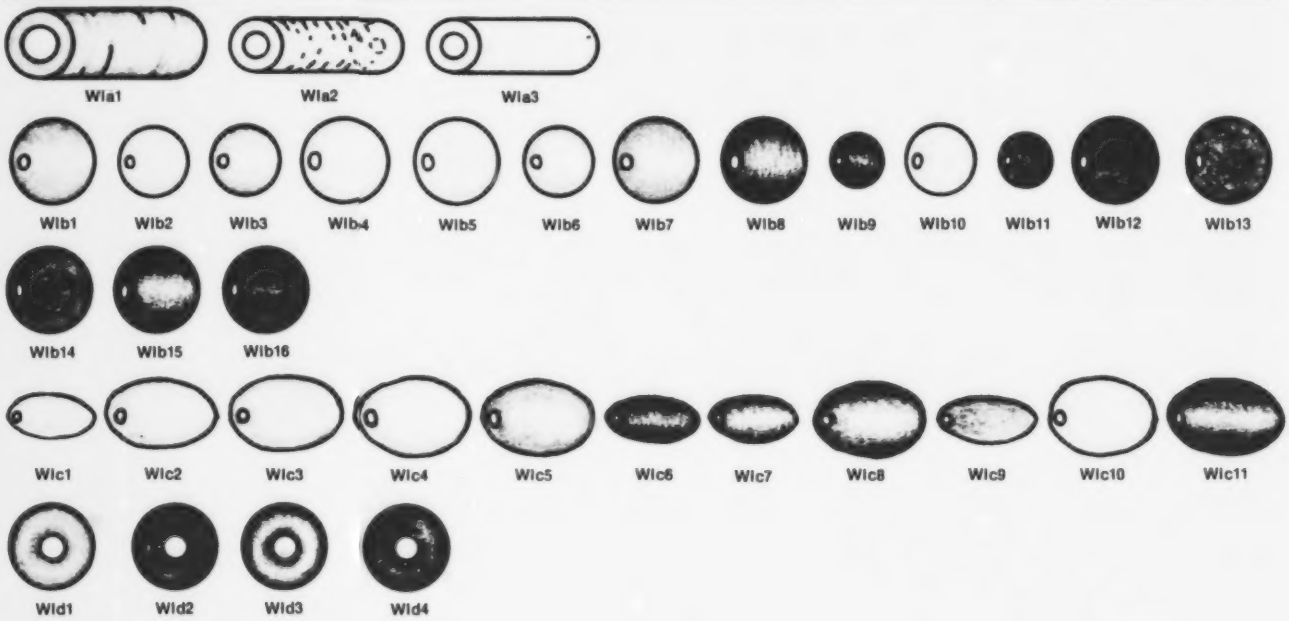
IVnn1 IVnn2 IVnn3 IVnn4 IVnn5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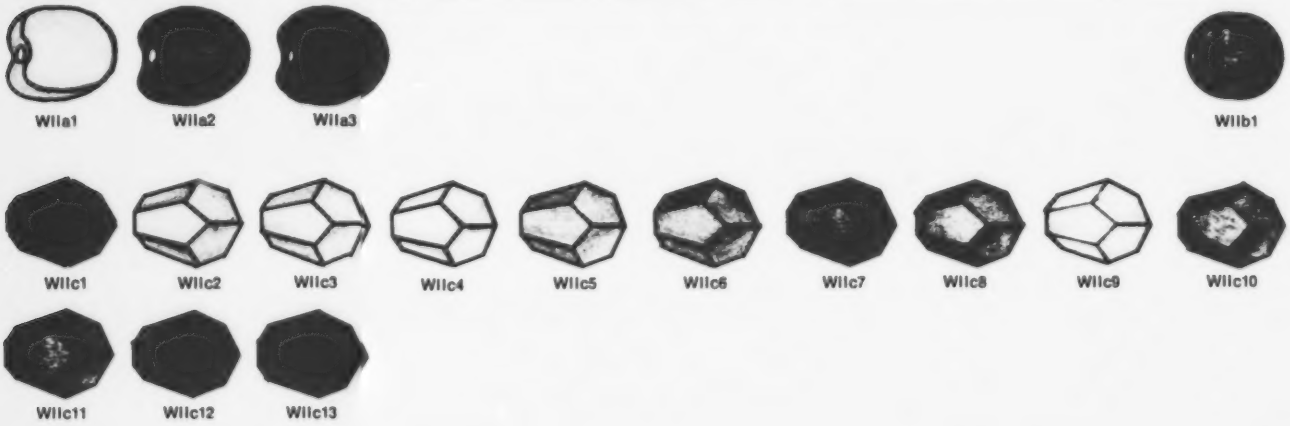
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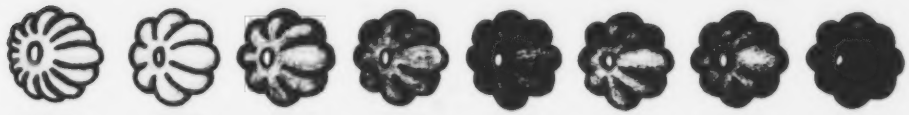
WIIa3
WIIb1
WIIc1
WIIc2
WIIc3
WIIc4
WIIc5
WIIc6
WIIc7
WIIc8
WIIc9
WIIc10
WIIc11
WIIc12
WIIc13

WIId1
WIId2
WIId3
WIId4
WIId5
WIId6
WIId7


WIIe1
WIIe2
WIIe3
WIIe4
WIIe5
WIIe6
WIIe7
WIIe8

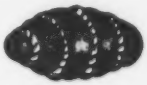
WIIf1
WIIf2
WIIf3
WIIf4
WIIf5

WIIg1
WIIg2

WIIIa1
WIIIa2

WIIIb1

WIIIc1
WIIIc2


WIIId1

WIIIe1

How to Use the Classification System to Identify Beads

To identify any bead, it is necessary to consult (a) the Tube Bead chart and the Wire Wound Bead chart; (b) the colour chart of beads already identified (Figs. 5-9); (c) the written description to accompany the bead charts and (d) the table of colours (p. 66). The following steps will be found helpful:

1 Determine whether the bead under examination is a tube or a wire wound bead (*see* section on *Technology of Glass Beads*).

2 If the bead is a tube bead type: (i) consult the tube bead chart to determine whether it follows the tube form or the rounded form; (ii) determine whether it is a Simple Bead (Class I or Class II) or a Layered Bead (Class III or Class IV). For example, in examining a group of tube beads, note those which are simple monochromes; those which are layered; and those which have stripes, eyes, etc. The same technique should be applied to round beads derived from tubes.

3 If the bead is wire wound, consult the wire wound bead chart for its proper placement.

4 Consult the colour illustrations of the individual beads for visual identification.

5 Consult the written descriptions which correspond to the colour illustrations (Figs. 5-9) to determine the precise colour, quality, size and shape classification (a full description of the above appears in Tables 1-6).

If no matching is possible, a new type may have been found; in which case it is desirable that it be reported in order that it may be properly incorporated into the system. If this suggestion meets with general favour, periodic supplements to this paper would be a possibility.

Readers who have found beads on sites in their area are invited to indicate the type or types on separate sheets (*see* sample form) and return them to the authors (Department of Anthropology, Trent University, Peterborough, Ontario). As noted on the sample form, characteristics of size and shape should be added, and new varieties described. By doing so, they will be adding information to what is already known about glass beads in the Northeast, and further afield. When sufficient additional material has been gathered, it will be made available to all interested parties.

Sample List of Hypothetical Collection of Beads

Name and Date of Site

Location of Site

Name and Address of Collection

List of Beads Already Recorded:

Ia1-S	IIb2-M	IIIb2-M	IVa12-M	WIb5-L
Ia1-M	IIb11-M	IIIb10-VL	IVa17-M	WIb15-L
Ia2-M	11b18-M	IIIbb3-L	IVa19-M	WIc5-L
Ia18-S	11b21-L	IIIbb5-L	IVb3-M	WId2-L
Ib2-S	IIb31-M	IIIbb7-L	IVb10-L	
Ibb4-M	IIb56-M	IIIc1-L	IVb15-S	WIIa1
Ic12-M	IIb74-L	IIIc'4-L	IVb26-VL	WIIb2
Ic'1-L	IIbb1-L	IIIf2-L	IVb29-M	WIIc4
Ie'1-L	IIbb6-M	IIIk3-S	IVb32-L	WIIc7
If2-L	IIbb11-VL	IIIm1-VL	IVb33-M	WIIc10
	IIb'4-L	IIIn3-M	IVbb7-M	WIIc12
IIa1-S	IIb'6-M		IVbb10-M	WIId2
IIa1-M	IIg3-M	Iva2-M	IVb'1-M	WIId6
IIa6-M	IIj2-L	IVa3-M	IVg1-M	WIIe3
IIa10-S		IVa5-VS	IVk2-M	WIIe8
IIa13-M	IIIa1-M	IVa5-S	IVk4-L	WIIf2
IIa14-S	IIIa2-M	IVa5-M	IVn3-L	WIIf5
IIa29-S	IIIa3-M	IVa5-L	IVnn5-VL	WIIg2
IIa40-S	IIIa7-M	IVa7-M		
IIa40-M	IIIa12-VS	IVa10-M	WIa2-M	WIIIa1
IIa53-S	IIIa12-M	IVa11-M	WIb2-S	WIIIc1

Variations of Beads Already Recorded:

Ia3-L	IIa34-S	IIIa3-L	IVb26-M	WIb3-S
Ia17-M	IIa50-M	IIIa9-M	IVbb7-L	WIb13-M
Ib2-M	IIb4-M	IIIb2-S	IVk4-M	WIb15-M
Ibb6-M	IIbb1-M	IIIbb2-L	IVh3-M	WIc1-M
Ib'4-S	IIg4-L			WIc4-S
Ic13-VL	IIh2-M	IVa10-L	WIa1-S	WIc8-S

New Types of Beads Not Recorded:

Ia	-S-tr-Lt. Ivory
Ib	-L-tr-Aqua Blue-3 Redwood Stripes & 3 White Stripes
Ibb	-M-op-Redwood-3 Black on White Stripes
Ic'	-M-tr-Brite Blue-loose twist, four sided
IIa	-O-M-op-Pale Blue
IIb	-R-M-cl-Brite Copan Blue with 12 Brite Navy Stripes ("Gooseberry" Bead)
IIIa	-M-op-Black with Black Core & White Middle Layer
IIIc	-L-cl-Turquoise with Redwood Core & White Middle Layer
IIIm	-Like IIIm1 except outside layer Teal Green
IVb	-O-M-op-Redwood with cl Apple Green Core & 3 White Stripes
IVh	-Like IIh1 plus Lt. Gray Core

Taylor, Helen D., Lucille Knoche & Walter Granville (Eds.)
Descriptive Color Names Dictionary. Container Corporation of America, Chicago.

The colours encountered in the beads seen and studied correspond to those shown on the colour chips in the above publication, numbered and named as below.

6 le	Redwood	op	cl		23 ni	Dk. Palm Green		cl	
8 pc	Ruby		cl		20 ng	Teal Green		cl	
7 pa	Scarlet		cl		17 pa	Turquoise		cl	
p	Lamp Black	op			16 ea	Lt. Aqua Blue	op	cl	tr
c	Lt. Gray		cl		18 gc	Aqua Blue	op		tr
b	Oyster White		cl	tr	16 ic	Robin's Egg Blue	op		tr
a	White	op			16 lc	Brite Blue		cl	tr
15 ca	Pale Blue	op	cl	tr	15 nc	Cerulean Blue		cl	
1 la	Lemon Yellow	op	cl		14 ia	Brite Copen Blue	op	cl	
2 ic	Lt. Gold	op	cl		14 ie	Shadow Blue	op	cl	tr
3 lc	Amber	op	cl		15 ni	Dk. Shadow Blue	op	cl	
3 le	Cinnamon	op	cl		13 la	Brite Dutch Blue	op		
4 ng	Maple		cl		13 pa	Ultramarine		cl	
1 gc	Citron		cl	tr	13 pg	Brite Navy		cl	
2 lg	Mustard Tan	op			14 pi	Dk. Navy		cl	
2 pn	Dk. Brown	op			7 ga	Lt. Cherry Rose	op	cl	
22 ia	Brite Mint Green	op	cl		8 le	Rose Wine		cl	
23 ic	Apple Green	op	cl		11 lc	Amethyst		cl	
22 ie	Surf Green	op		tr	7 pn	Dk. Rose Brown		cl	tr
21 nc	Emerald Green		cl		6 lc	Coral			tr

The abbreviations *op*, *cl*, and *tr*, after the names indicate whether the colour occurs in *opaque*, *clear* or *translucent* glass.

Abbreviations Which Occur in Tables

Size:
VS - Very Small, under 2 mm.
S - Small, 2-4 mm.
M - Medium, 4-6 mm
L - Large, 6-10 mm.
VL - Very Large, over 10 mm.

Shape:
R - Round
C - Circular (Ring)
O - Oval
T - Tube
F - Flat
D - Disk
CO - Corn
ME - Melon
RA - Raspberry
ST - Star
FA - Facetted
DO - Donut

Type of Glass:
op - Opaque
cl - Clear
tr - Translucent

Table 1: Description of Class I Beads (Fig. 5)

Type	Bead Number	Size	Glass	Name of Colour
Ia	Ia1	VS	op	Redwood
		S	op	Redwood
		M	op	Redwood
		L	op	Redwood
	Ia2	S	op	Black
		M	op	Black
		L	op	Black
		VL	op	Black
	Ia3	M	cl	Lt. Gray
	Ia4	S	tr	Oyster White
		M	tr	Oyster White
	Ia5	S	op	White
		M	op	White
	Ia6	S	op	Lt. Ivory
	Ia7	S	op	Lt. Gold
	Ia8	S	tr	Citron
	Ia9	L	op	Brite Mint Green
	Ia10	M	op	Surf Green
	Ia11	M	tr	Teal Green
	Ia12	M	cl	Turquoise
	Ia13	S	tr	Aqua Blue
	Ia14	M	op	Robin's Egg Blue
	Ia15	L	tr	Brite Blue
	Ia16	M	op	Shadow Blue
	Ia17	S	cl	Dk. Shadow Blue
	Ia18	S	cl	Ultramarine
		M	cl	Ultramarine
	Ia19	S	cl	Brite Navy
		M	cl	Brite Navy
	Ia20	L	cl	Dark Navy
	Ia21	S	cl	Rose Wine
	Ia22	S	tr	Dk. Rose Brown

Body					Simple Stripes	
Type	Bead Number	Size	Glass	Name of Colour	Number of Stripes and Name of Colour	
Ib	Ib1	L	op	Redwood	6 Black	
	Ib2	S	op	Redwood	6 White	
	Ib3	S	op	Black	3 Redwood	
		L	op	Black	3 Redwood	
	Ib4	S	op	Black	3 White	
	Ib5	L	op	Black	3 White	3 Redwood
	Ib6	M	cl	Lt. Gray	6 Ultramarine	
	Ib7	S	tr	Oyster White	3 Redwood	3 Ultramarine
	Ib8	L	tr	Oyster White	6 Redwood	6 Ultramarine
	Ib9	M	tr	Oyster White	3 Redwood	3 Dk. Palm Green
	Ib10	S	op	White	3 Redwood	
	Ib11	L	op	White	6 Redwood	
	Ib12	M	op	White	3 Black	
	Ib13	M	op	Pale Blue	3 Redwood	
	Ib14	S	op	Lt. Gold	3 Dk. Palm Green	
	Ib15	L	op	Lt. Gold	3 Dk. Palm Green	3 Redwood
	Ib16	M	op	Amber	6 Redwood	6 Black
	Ib17	S	cl	Apple Green	3 Redwood	
	Ib18	L	cl	Teal Green	8 White	
	Ib19	L	tr	Aqua Blue	3 Redwood	
	Ib20	M	tr	Robin's Egg Blue	3 Redwood	
	Ib21	S	op	Shadow Blue	6 Redwood	
	Ib22	L	cl	Dk. Shadow Blue	6 Redwood	6 White
	Ib23	S	cl	Brite Navy	3 Redwood	
	Ib24	M	tr	Dk. Rose Brown	2 Redwood	2 White

Table 1: Description of Class I Beads (Fig. 5) (continued)

				Body	Compound Stripes			
Type	Bead Number	Size	Glass	Name of Colour	Number of Stripes and Name of Their Colours			
Ibb	Ibb1	M	op	Redwood	3	Brite Navy	on White	
		L	op	Redwood	3	Brite Navy	on White	
	Ibb2	S	op	Black	3	Redwood	on White	
		L	op	Black	3	Redwood	on White	
	Ibb3	L	op	White	4	Lt. Gold (Double)	on Maple	
	Ibb4	M	op	Pale Blue	3	White	on Redwood	
	Ibb5	L	op	Brite Mint Green	4	Lemon Yellow	on Scarlet	on White
	Ibb6	S	op	Aqua Blue	3	Redwood	on White	

				Body	Simple Stripes		
Type	Bead Number	Size	Glass	Name of Colour	Number of Stripes and Name of Their Colour		
Ib'	Ib'1	M	op	Redwood	8	White	
	Ib'2	M	op	White	9	Brite Navy (3 groups of 3 fine stripes)	
	Ib'3	M	cl	Dk. Shadow Blue	3	Redwood	3 White
	Ib'4	M	cl	Brite Navy	8	White	

				Body	Compound Stripes		
Type	Bead Number	Size	Glass	Name of Colour	Number of Stripes and Name of Their Colour		
Ibb'	Ibb'1	M	op	Surf Green	3	White	on Redwood

Type	Bead Number	Size	Glass	Name of Colour	Number of Sides
Ic	Ic1	M	op	Redwood	4
		L	op	Redwood	4
	Ic2	S	cl	Ruby	4
	Ic3	VS	cl	Scarlet	6
	Ic4	S	op	Black	6
	Ic5	S	cl	Lt. Gray	5
	Ic6	VS	cl	Oyster White	5
		S	cl	Oyster White	5
	Ic7	VS	cl	Lemon Yellow	6
	Ic8	S	cl	Amber	5
	Ic9	VS	cl	Apple Green	5
		S	cl	Apple Green	5
	Ic10	VS	cl	Turquoise	5
	Ic11	VS	tr	Brite Blue	4
	Ic12	S	cl	Brite Copen Blue	6
		M	cl	Brite Copen Blue	6
	Ic13	M	cl	Brite Navy	6
	Ic14	VS	cl	Brite Navy	5
	Ic15	S	tr	Dk. Rose Brown	4

Table 1: Description of Class I Beads (Fig. 5) (continued)

Type	Bead Number	Size	Glass	Name of Colour	Type of Twist
Ic'	Ic'1	S	op	Redwood	Loose Twist
		M	op	Redwood	Medium Twist
		L	op	Redwood	Tight Twist
	Ic'2	M	cl	Apple Green	Tight Twist
	Ic'3	M	cl	Ultramarine	Tight Twist

				Body	**Simple Stripe**
Type	Bead Number	Size	Glass	Name of Colour	Number of Stripes and Name of Their Colour
Id	Id1	M	op	Redwood	8 White (Thin)

				Body	**Simple Stripes**	
Type	Bead Number	Size	Glass	Name of Colour	Number of Stripes and Name of Their Colour	Type of Twist
Id'	Id'1	M	op	Redwood	8 White (Thin)	Loose Twist

Type	Bead Number	Size	Glass	Name of Colour
Ie	Ie1	L	op	Redwood

Type	Bead Number	Size	Glass	Name of Colour	Type of Twist
Ie'	Ie'1	L	op	Redwood	Medium Twist
	Ie'2	M	cl	Apple Green	Medium Twist

Type	Bead Number	Size	Glass	Name of Colour	Number of Sides
If	If1	L	op	Black	6
	If2	L	cl	Lt. Gray	6
	If3	L	cl	Emerald	6
	If4	S	cl	Turquoise	5
	If5	L	cl	Amethyst	6

Table 2: Description of Class II Beads (Fig. 6)

Type	Bead Number	Shape	Size	Glass	Name of Colour
IIa	IIa1	R	VS	op	Redwood
		R	S	op	Redwood
		R	M	op	Redwood
		R	L	op	Redwood
	IIa2	C	M	op	Redwood
	IIa3	O	S	op	Redwood
	IIa4	R	M	cl	Redwood
	IIa5	R	VS	cl	Ruby
	IIa6	R	VS	op	Black
		R	S	op	Black
		R	M	op	Black
		R	L	op	Black
		R	VL	op	Black
	IIa7	C	VS	op	Black
		C	S	op	Black
		C	M	op	Black
	IIa8	O	S	op	Black
		O	M	op	Black
		O	L	op	Black
	IIa9	R	L	cl	Lt. Gray
	IIa10	O	S	cl	Lt. Gray
	IIa11	R	VS	tr	Oyster White
	IIa12	C	S	tr	Oyster White
	IIa13	R	VS	op	White
		R	S	op	White
		R	M	op	White
		R	L	op	White
	IIa14	C	S	op	White
	IIa15	O	S	op	White
		O	M	op	White
	IIa16	R	L	op	Pale Blue
	IIa17	R	VS	op	Lt. Gold
		R	S	op	Lt. Gold
		R	M	op	Lt. Gold
	IIa18	R	VS	op	Amber
		R	S	op	Amber
	IIa19	C	S	op	Amber
	IIa20	R	S	op	Cinnamon
	IIa21	R	S	tr	Citron
	IIa22	R	S	op	Mustard Tan
	IIa23	R	S	cl	Brite Mint Green
	IIa24	R	S	op	Apple Green
	IIa25	R	VS	op	Surf Green
		R	M	op	Surf Green
	IIa26	R	VS	cl	Emerald Green
	IIa27	C	S	cl	Emerald Green
	IIa28	R	M	cl	Dk. Palm Green
		R	L	cl	Dk. Palm Green
IIa	IIa29	O	S	cl	Dk. Palm Green
	IIa30	F	L	cl	Dk. Palm Green
	IIa31	R	VS	cl	Turquoise
		R	M	cl	Turquoise
		R	L	cl	Turquoise
	IIa32	O	S	cl	Turquoise
	IIa33	R	L	cl	Lt. Aqua Blue
	IIa34	C	M	tr	Lt. Aqua Blue
	IIa35	R	M	op	Lt. Aqua Blue
	IIa36	R	S	op	Aqua Blue
		R	M	op	Aqua Blue
	IIa37	C	S	op	Aqua Blue
	IIa38	O	S	op	Aqua Blue
	IIa39	R	S	tr	Aqua Blue
	IIa40	R	VS	op	Robin's Egg Blue
		R	S	op	Robin's Egg Blue
		R	M	op	Robin's Egg Blue
		R	L	op	Robin's Egg Blue
	IIa41	C	S	op	Robin's Egg Blue
	IIa42	O	S	op	Robin's Egg Blue
	IIa43	R	VS	tr	Brite Blue
		R	S	tr	Brite Blue
	IIa44	R	VS	cl	Cerulean Blue
		R	M	cl	Cerulean Blue
		R	L	cl	Cerulean Blue
	IIa45	C	S	cl	Brite Copan Blue
	IIa46	R	S	op	Shadow Blue
		R	M	op	Shadow Blue
	IIa47	C	S	op	Shadow Blue
	IIa48	R	S	op	Dk. Shadow Blue
	IIa49	O	S	op	Dk. Shadow Blue
	IIa50	R	S	cl	Dk. Shadow Blue
		R	L	cl	Dk. Shadow Blue
	IIa51	C	S	cl	Dk. Shadow Blue
	IIa52	R	M	cl	Ultramarine
		R	L	cl	Ultramarine
	IIa53	C	S	cl	Ultramarine
	IIa54	O	L	cl	Ultramarine
	IIa55	R	S	cl	Brite Navy
		R	L	cl	Brite Navy
	IIa56	C	S	cl	Brite Navy
	IIa57	O	S	cl	Brite Navy
	IIa58	R	VS	cl	Lt. Cherry Rose
		R	S	cl	Lt. Cherry Rose
	IIa59	C	M	cl	Rose Wine
	IIa60	O	S	cl	Rose Wine
	IIa61	R	S	cl	Dk. Rose Brown

Table 2: Description of Class II Beads (Fig. 6) (continued)

					Body	Simple Stripes			
Type	Bead Number	Shape	Size	Glass	Name of Colour	Number of Stripes Style of Stripes (Average width unless noted) Colour of Stripes			
IIb	IIb1	R	S	op	Redwood	6 op	Black		
	IIb2	R	M	op	Redwood	3 op	White		
	IIb3	R	M	op	Redwood	4 op	White		
	IIb4	O	S	op	Redwood	4 op	White		
	IIb5	R	S	op	Redwood	6 op	White		
	IIb6	R	S	op	Redwood	8 op	White		
	IIb7	R	L	op	Redwood	12 op	White		
	IIb8	R	L	op	Redwood	6 op	Lemon Yellow		
	IIb9	R	M	op	Black	3 op	Redwood		
	IIb10	R	S	op	Black	3 op	White		
		R	VL	op	Black	3 op	White		
	IIb11	O	M	op	Black	3 op	White		
	IIb12	R	M	op	Black	4 op	White		
	IIb13	R	L	op	Black	10 op	White		
	IIb14	R	L	op	Black	3 op	Double White		
	IIb15	R	L	op	Black	3 op	Broad Redwood	3 Broad White	
	IIb16	R	L	op	Black	3 op	Ruby	3 Lt. Cherry Rose	
	IIb17	R	M	op	Black	3 op	Redwood	3 White	3 Lemon Yellow
	IIb18	R	S	cl	Lt. Gray	12 op	Thin White	These are called "Gooseberry" beads. The stripes may vary from 12 to 15 and colour may vary from very light to dark with occasionally a yellow cast.	
		R	M	cl	Lt. Gray	12 op	Thin White		
		R	L	cl	Lt. Gray	12 op	Thin White		
	IIb19	O	S	cl	Lt. Gray	12 op	Thin White		
	IIb20	R	L	op	White	3 op	Redwood		
	IIb21	O	L	op	White	3 op	Redwood		
	IIb22	F	L	op	White	8 op	Redwood		
	IIb23	R	M	op	White	4 op	Black		
	IIb24	O	M	op	White	4 op	Black		
	IIb25	R	M	op	White	4 tr	Brite Navy		
	IIb26	O	M	op	White	4 tr	Brite Navy		
	IIb27	R	L	op	White	9 tr	Brite Navy	(3 Groups of 3 Fine Lines)	
	IIb28	O	L	op	White	9 tr	Brite Navy	(3 Groups of 3 Fine Lines)	
	IIb29	R	M	op	White	3 op	Redwood	3 op Black	
	IIb30	O	M	op	White	3 op	Redwood	3 op Black	
	IIb31	R	S	op	White	2 op	Redwood	2 tr Brite Navy	
		R	M	op	White	2 op	Redwood	2 tr Brite Navy	
	IIb32	O	M	op	White	2 op	Redwood	2 tr Brite Navy	
	IIb33	R	M	op	White	3 op	Redwood	3 tr Dk. Palm Green	
	IIb34	O	M	op	White	3 op	Redwood	3 tr Dk. Palm Green	
	IIb35	R	M	op	White	4 op	Lemon Yellow	4 tr Dk. Palm Green	
	IIb36	O	M	op	White	4 op	Lemon Yellow	4 tr Dk. Palm Green	
	IIb37	R	M	op	White	2 op	Dk. Brown	2 tr Dk. Palm Green	
	IIb38	R	M	op	White	2 op	Dk. Brown	2 tr Dk. Palm Green	
	IIb39	R	M	op	White	2 op	Redwood	2 Dk. Palm Green	2 Brite Navy

Table 2: Description of Class II Beads (Fig. 6) (continued)

					Body	Simple Stripes			
Type	Bead Number	Shape	Size	Glass	Name of Colour	Number of Stripes Style of Stripes Colour of Stripes			
IIb	IIb40	O	M	op	White	2 op	Redwood	2 Dk. Palm Green	2 Brite Navy
	IIb41	R	M	op	White	3 tr	Dk. Palm Green	3 tr Brite Navy	
	IIb42	R	M	op	Pale Blue	3 op	Redwood		
	IIb43	R	M	op	Pale Blue	3 op	Redwood	3 tr Brite Navy	
	IIb44	O	M	op	Pale Blue	5 op	Redwood	5 tr Brite Navy	
	IIb45	R	M	cl	Lt. Gold	4 op	White		
	IIb46	R	M	op	Lt. Gold	2 op	Redwood	2 tr Dk. Palm Green	
	IIb47	F	L	op	Lt. Gold	2 op	Redwood	2 tr Dk. Palm Green	
	IIb48	R	M	op	Mustard Tan	8 op	Redwood		
		R	L	op	Mustard Tan	8 op	Redwood		
	IIb49	O	L	op	Mustard Tan	8 op	Redwood		
	IIb50	R	L	op	Mustard Tan	8 op	White		
	IIb51	F	L	tr	Surf Green	8 op	Lt. Gold		
	IIb52	R	M	cl	Emerald Green	4 op	White		
	IIb53	R	L	cl	Teal Green	8 op	White		
	IIb54	R	L	tr	Lt. Aqua Blue	8 op	Redwood		
	IIb55	F	L	tr	Lt. Aqua Blue	8 op	Redwood		
	IIb56	R	S	op	Robin's Egg Blue	3 op	White		
		R	M	op	Robin's Egg Blue	3 op	White		
		R	L	op	Robin's Egg Blue	3 op	White		
	IIb57	R	L	op	Robin's Egg Blue	4 op	White		
	IIb58	R	M	op	Robin's Egg Blue	2 op	Redwood	2 op White	
	IIb59	R	L	tr	Brite Blue	3 op	Redwood		
	IIb60	O	S	cl	Brite Copan Blue	12 tr	Brite Navy "Gooseberry" Bead		
	IIb61	R	M	op	Shadow Blue	6 op	Redwood		
	IIb62	R	M	cl	Dk. Shadow Blue	8 op	Redwood		
	IIb63	O	S	cl	Dk. Shadow Blue	2 op	White		
	IIb64	O	M	cl	Dk. Shadow Blue	2 op	Redwood	2 op White	
	IIb65	R	L	cl	Brite Navy	2 op	Broad Redwood		
	IIb66	O	L	cl	Brite Navy	4 op	Redwood		
	IIb67	O	S	cl	Brite Navy	3 op	White		
		O	L	cl	Brite Navy	3 op	White		
	IIb68	R	M	cl	Brite Navy	4 op	White		
	IIb69	O	S	cl	Brite Navy	4 op	White		
	IIb70	R	L	cl	Brite Navy	16 op	Thin White		
	IIb71	R	M	cl	Brite Navy	2 op	Redwood	2 op White	
	IIb72	O	S	cl	Brite Navy	2 op	Redwood	2 op White	
	IIb73	O	M	tr	Dk. Navy	3 op	White		
	IIb74	R	L	tr	Dk. Rose Brown	9 op	White (3 Groups of 3 Thin Lines)		

Table 3: Description of Class II Beads (Fig. 7)

					Body	Compound Stripes		
Type	Bead Number	Shape	Size	Glass	Name of Colour	Number of Stripes Style of Stripes Colour of Stripes		
IIbb	IIbb1	R	L	op	Redwood	3 Brite Navy	on White	
	IIbb2	F	L	op	Redwood	3 Brite Navy	on White	
	IIbb3	R	L	op	Redwood	4 Brite Navy	on White	
	IIbb4	R	VL	op	Redwood	3 Brite Navy 3 Lt. Gold	on White	
	IIbb5	R	L	op	Black	5 Thin Redwood	on White	
	IIbb6	O	M	op	Black	3 Thin Redwood	on White	
	IIbb7	R	VL	op	Black	3 Broad Redwood	on White	
	IIbb8	R	VL	op	Black	3 Double Redwood	on White	
	IIbb9	R	VL	op	Black	3 Lemon Yellow between Redwood		
	IIbb10	R	VL	op	Black	3 Lemon Yellow between Redwood 3 Fine Brite Navy	on White	
	IIbb11	R	VL	op	Black	2 Fine Redwood 2 Redwood 2 Amber	on White	
	IIbb12	R	M	op	White	3 Brite Navy	on Redwood	
	IIbb13	O	M	op	White	3 Brite Navy	on Redwood	
	IIbb14	R	M	op	White	3 Lemon Yellow	on Brite Navy	(Yellow stripe
	IIbb15	O	M	op	White	3 Lemon Yellow	on Brite Navy	appears green)
	IIbb16	R	M	op	White	3 Redwood	on Dk. Palm Green	
	IIbb17	O	M	op	White	3 Redwood	on Dk. Palm Green	
	IIbb18	R	M	op	Pale Blue	3 Redwood	on White	
	IIbb19	O	M	op	Pale Blue	3 Redwood	on White	
	IIbb20	R	VL	op	Mustard Tan	4 Brite Navy 8 Redwood (In Pairs Between Other Stripes)	on White	
	IIbb21	R	M	op	Teal Green	3 Redwood	on White	
	IIbb22	R	M	op	Lt. Aqua Blue	3 Redwood	on White	
	IIbb23	O	M	op	Lt. Aqua Blue	3 Redwood	on White	
	IIbb24	R	M	op	Robin's Egg Blue	3 Redwood	on White	
	IIbb25	O	M	op	Robin's Egg Blue	3 Redwood	on White	
	IIbb26	R	M	op	Robin's Egg Blue	3 Redwood	on Lemon Yellow	
	IIbb27	R	M	cl	Brite Navy	3 Redwood	on White	
	IIbb28	O	S	cl	Brite Navy	3 Dk. Brown	on White	
	IIbb29	F	L	cl	Dk. Rose Brown	3 Brite Navy	on White	

Table 3: Description of Class II Beads (Fig. 7) (continued)

					Body	Simple Stripes
Type	Bead Number	Shape	Size	Glass	Name of Colour	Number of Stripes Colour of Stripes
IIb'	IIb'1	R	M	op	Redwood	6 White
	IIb'2	R	S	op	Black	7 White
	IIb'3	O	M	op	Black	3 White
	IIb'4	O	L	tr	Oyster White	Numerous irregular stripes- Lt. Gold, Redwood, Ultramarine, Aqua Blue. (Marbled effect)
	IIb'5	R	M	op	White	6 Redwood
	IIb'6	O	M	op	White	6 Redwood
	IIb'7	O	M	op	White	9 Brite Navy (3 Groups of 3 Thin Lines)
	IIb'8	O	M	op	White	3 Lemon Yellow 3 Brite Navy
	IIb'9	O	L	op	Mustard Tan	6 White
	IIb'10	F	L	op	Mustard Tan	6 White
	IIb'11	R	L	op	Robin's Egg Blue	6 Redwood (6 Stripes which had disappeared)
	IIb'12	R	M	tr	Brite Navy	4 White
	IIb'13	R	L	cl	Dk. Rose Brown	9 White (3 Groups of 3 Thin Lines)

					Body	Compound Stripes
Type	Bead Number	Shape	Size	Glass	Name of Colour	Number of Stripes Colour of Stripes
IIbb'	IIbb'1	R	L	op	Teal Green	3 Redwood on Lemon Yellow
	IIbb'2	R	L	op	Robin's Egg Blue	6 Redwood on Lemon Yellow

					Body	"Melon" Beads
Type	Bead Number	Shape	Size	Glass	Name of Colour	
IIe	IIe1	R	M	cl	Brite Blue	7 Ridges
	IIe2	R	M	cl	Brite Blue	8 Ridges

					Body	"Flush Eye" Beads	
Type	Bead Number	Shape	Size	Glass	Name of Colour	Name of Colour	Decoration
IIg	IIg1	R	M	op	Black	3 White Dots	
	IIg2	O	M	op	White	3 Redwood Stars	
	IIg3	R	M	op	White	3 Redwood Stars on White Dots on Brite Blue Dots	
	IIg4	R	M	op	White	3 Brite Navy Dots each containing 2 White Rings	
	IIg5	R	M	op	Shadow Blue	3 Redwood Dots on White Dots	

Table 3: Description of Class II Beads (Fig. 7) (continued)

Bead with "Flush Eye" and Stripes
This bead has always appeared as two joined beads

					Body	**Decoration**
Type	Bead Number	Shape	Size	Glass	Name of Colour	Name of Colours Description
IIh	IIh1	O	M	op	Shadow Blue	3 Redwood Stars on White Dots 3 White Stripes between "Flush Eyes"

"Roman" Beads

					Body	**Decoration**
Type	Bead Number	Shape	Size	Glass	Name of Colour	Name of Colours Description of Decoration
IIj	IIj1	R	M	op	Black	2 White Parallel Wavy Lines
	IIj2	R	L	op	Black	3 White Alternating Wavy Lines
	IIj3	R	L	op	Black	2 Lemon Yellow Alternating Wavy Lines
	IIj4	R	L	op	Black	1 Lemon Yellow between 2 White Parallel Wavy Lines
	IIj5	R	L	op	Black	2 White Spirals between 2 Lemon Yellow Spirals
	IIj6	R	M	cl	Brite Blue	2 White Alternating Wavy Lines

Table 4: Description of Class III Beads (Fig. 7)

Type	Bead Number	Size	Glass	Outside Layer Colour Name	Glass	Core Colour Name	Glass	Middle Layer Colour Name
IIIa	IIIa1	M	op	Redwood	op	Black		
	IIIa2	M	op	Redwood	cl	Lt. Gray		
	IIIa3	S	op	Redwood	cl	Apple Green		
		M	op	Redwood	cl	Apple Green		
	IIIa4	M	op	Redwood	cl	Brite Blue		
	IIIa5	M	cl	Scarlet	op	White		
	IIIa6	M	cl	Lt. Gray	cl	Lt. Gray	op	Redwood
	IIIa7	M	cl	Lt. Gray	cl	Lt. Gray	op	White
	IIIa8	S	tr	Oyster White	cl	Lt. Gray		
	IIIa9	S	tr	Shadow Blue	cl	Brite Navy		
	IIIa10	VS	cl	Ultramarine	cl	Ultramarine	op	White
		S	cl	Ultramarine	cl	Ultramarine	op	White
	IIIa11	S	cl	Brite Navy	cl	Lt. Gray	op	White
	IIIa12	VS	cl	Brite Navy	cl	Brite Navy	op	White
		S	cl	Brite Navy	cl	Brite Navy	op	White
		M	cl	Brite Navy	cl	Brite Navy	op	White

Type	Bead Number	Size	Glass	Outside Layer Colour Name	Glass	Core Colour Name	Glass	Middle Colour Name	Simple Stripes Colour Name Number of Stripes	
IIIb	IIIb1	VS	op	Redwood	op	Black			6 op White	
	IIIb2	M	op	Redwood	cl	Apple Green			6 op White	
	IIIb3	S	cl	Lt. Gray	cl	Lt. Gray	op	White	3 op Black	
	IIIb4	S	tr	Oyster White	cl	Brite Copan Blue			6 Redwood	6 Brite
	IIIb5	L	tr	Oyster White	cl	Brite Copan Blue			4 Redwood	4 Brite
	IIIb6	L	cl	Lt. Aqua Blue	cl	Lt. Aqua Blue	op	White	8 op White	
	IIIb7	M	cl	Shadow Blue	cl	Shadow Blue	op	White	8 op White	
	IIIb8	M	cl	Dk. Shadow Blue	op	Redwood	op	White	3 op White	
	IIIb9	L	cl	Brite Navy	cl	Brite Navy	op	White	15 op White	
	IIIb10	VL	cl	Dk. Navy	cl	Dk. Navy	op	White	16 op White	

Type	Bead Number	Size	Glass	Outside Layer Colour Name	Glass	Core Colour Name	Glass	Middle Colour Name	Compound Stripes Colour Name Number of Stripes	
IIIbb	IIIbb1	L	op	Redwood	cl	Black			3 op Black	on White
	IIIbb2	S	op	Redwood	op	Black			3 cl Brite Navy	on White
	IIIbb3	L	op	Redwood	op	Black			4 cl Brite Navy	on White
	IIIbb4	L	op	Redwood	cl	Apple Green			3 op Black	on White
	IIIbb5	L	op	Redwood	cl	Apple Green			3 cl Brite Navy	on White
	IIIbb6	L	op	Black	cl	Lt. Gray			3 op Redwood	on White
	IIIbb7	L	cl	Brite Navy	cl	Brite Navy	op	White	3 op Redwood	on White
	IIIbb8	L	cl	Brite Navy	cl	Brite Navy	op	White	3 cl Aqua Blue	on White

Table 4: Description of Class III Beads (Fig. 7) (continued)

			Outside		Core		Middle Layer	
Type	Bead Number	Size	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name
IIIc	IIIc1	L	cl	Brite Blue	cl	Brite Blue	op	White
	IIIc2	L	tr	Shadow Blue	cl	Lt. Gray	op	White
	IIIc3	L	cl	Brite Navy	cl	Lt. Gray	op	White
IIIc'	IIIc'1	L	op	Redwood	op	Black		
	IIIc'2	L	op	Redwood	cl	Apple Green		
	IIIc'3	L	cl	Turquoise	op	Redwood	op	White
	IIIc'4	L	cl	Turquoise	cl	Brite Navy	op	White
IIIe	IIIe1	M	op	Redwood	op	Black		
	IIIe2	M	cl	Lt. Gray	cl	Lt. Gray	op	Redwood
IIIe'	IIIe'1	M	op	Redwood	op	Black		
IIIf	IIIf1	L	cl	Lt. Gray	tr	Oyster White		
	IIIf2	L	cl	Ultramarine	tr	Lt. Aqua Blue		

Table 4: Description of Class III Beads (Fig. 7) (continued)

Tube "Star" Beads (The Layers are Named from the Outside Inward)

Type IIIk "Star" Tube Bead with Plain Outside Layer

Type	Bead Number	Size	Glass	Outside		2nd		3rd		4th		5th	
IIIk	IIIk1	VL	op	Redwood	op	White	cl	Brite Blue	op	White	cl	Brite Blue	(
	IIIk2	L	cl	Teal Green	op	White	op	Redwood	op	Black			(
	IIIk3	S	cl	Brite Navy	op	White	op	Redwood	op	White	cl	Brite Blue	(

*1 Outside layer very thick. Ends of bead slightly milled.

*2 Outside layer thin so ridges of next layer show through like stripes.

*3 Ends of bead ground to point to show design of inner layers.

Type IIIm True "Star" Bead (Large tube ground down to round or oval form to show ridges of next layer and end design of inner layer Beads occur in size from Small to Very Large up to 2½" long.

Type	Bead Number	Glass	Outside	2nd		3rd		4th		5th		6th		7th
IIIm	IIIm1	cl	Brite Blue	op	White	op	Redwood	op	White	cl	Brite Blue	op	White	cl	Brite Blue

Type IIIn "Star" Tube Bead with Stripes Inlayed in Outside Layer

Type	Bead Number	Glass	Outside		2nd		3rd		4th		5th		Stripes	
IIIn	IIIn1	tr	Oyster White	op	White	op	Redwood	op	White	cl	Lt. Gray	6	op	Redwood
												6	cl	Brite Navy
	IIIn2	tr	Oyster White	op	White	op	Redwood	op	White	cl	Brite Blue	6	op	Redwood
												6	cl	Brite Navy
	IIIn3	tr	Oyster White	op	Redwood	op	White	op	White	cl	Brite Blue	4	op	Redwood
												4	cl	Dk. Palm Gree
												4	cl	Brite Navy

Table 5: Description of Class IV Beads (Fig. 8)

Type	Bead Number	Shape	Size	Glass	Outside Name of Colour	Glass	Core Name of Colour	Glass	Middle Layer Name of Colour
IVa	IVa1	R	M	op	Redwood	op	Black		
	IVa2	R	VS	op	Redwood	cl	Lt. Gray		
		R	S	op	Redwood	cl	Lt. Gray		
		R	M	op	Redwood	cl	Lt. Gray		
		R	L	op	Redwood	cl	Lt. Gray		
	IVa3	C	M	op	Redwood	cl	Lt. Gray		
	IVa4	O	S	op	Redwood	cl	Lt. Gray		
	IVa5	R	VS	op	Redwood	cl	Apple Green		
		R	S	op	Redwood	cl	Apple Green		
		R	M	op	Redwood	cl	Apple Green		
		R	L	op	Redwood	cl	Apple Green		
	IVa6	C	M	op	Redwood	cl	Apple Green		
	IVa7	O	M	op	Redwood	cl	Apple Green		
	IVa8	R	M	op	Redwood	cl	Brite Blue		
	IVa9	R	VS	cl	Scarlet	op	White		
		R	S	cl	Scarlet	op	White		
	IVa10	R	M	op	Black	op	Black	op	White
	IVa11	C	M	cl	Lt. Gray	cl	Lt. Gray	op	White
	IVa12	C	M	cl	Lt. Gray	cl	Lt. Gray	op	Brite Navy (Bead Appears Blue)
	IVa13	C	S	tr	Oyster White	cl	Lt. Gray		
		C	M	tr	Oyster White	cl	Lt. Gray		
	IVa14	C	M	tr	Oyster White	cl	Lt. Aqua Blue		
	IVa15	R	M	cl	Apple Green	cl	Apple Green	op	White
	IVa16	R	M	op	Robin's Egg Blue	op	Robin's Egg Blue	op	White
	IVa17	C	M	cl	Ultramarine	cl	Ultramarine	op	White
	IVa18	R	M	cl	Brite Navy	cl	Lt. Gray		
	IVa19	C	M	cl	Brite Navy	cl	Brite Navy	op	White

Table 5. Description of Class IV Beads (Fig. 8) (continued)

					Body of Bead					Simple Stripes		
Type	Bead Number	Shape	Size	Glass	Outside Colour	Glass	Core Colour	Glass	Middle Colour	Number of Stripes Colour of Stripes Type of Glass		
IVb	IVb1	R	M	op	Redwood	op	Black			8 op Black		
	IVb2	R	M	op	Redwood	cl	Lt. Gray			11 op Black		
	IVb3	R	M	op	Redwood	op	Black			3 op Broad White		
	IVb4	R	M	op	Redwood	op	Black			6 op White (3 Pairs)		
	IVb5	R	L	op	Redwood	op	Black			6 op White		
	IVb6	R	S	op	Redwood	op	Black			8 op White		
	IVb7	R	L	op	Redwood	op	Black			12 op White		
	IVb8	R	L	op	Redwood	op	Black	op	White	4 op White		
	IVb9	R	S	op	Redwood	cl	Brite Blue			8 op White		
	IVb10	R	M	op	Redwood	cl	Apple Green			3 op White		
		R	L	op	Redwood	cl	Apple Green			3 op White		
	IVb11	R	L	op	Redwood	cl	Apple Green			6 op White		
	IVb12	R	S	cl	Scarlet	op	White			8 op White (4 Pairs)		
	IVb13	R	M	op	White	cl	Lt. Aqua			6 op Redwood		
	IVb14	C	S	op	White	cl	Lt. Gray			4 op Redwood	4 op	Black
	IVb15	C	S	op	White	cl	Lt. Gray			4 op Redwood	4 cl	Br. Navy
	IVb16	C	S	op	White	cl	Lt. Aqua Blue			3 op Redwood	3 cl	Br. Navy
	IVb17	C	S	op	White	cl	Lt. Gray			2 op Black	2 tr	Lt. Aqua Blue
	IVb18	R	M	cl	Apple Green	cl	Apple Green	op	White	3 op White		
	IVb19	R	M	cl	Apple Green	cl	Apple Green	op	White	3 cl Lemon Yellow		
	IVb20	R	M	cl	Dk. Palm Green	cl	Apple Green	op	White	6 op White		
	IVb21	R	M	cl	Teal Green	cl	Lt. Gray			4 op White		
	IVb22	R	M	cl	Lt. Aqua Blue	cl	Lt. Aqua Blue	op	Lemon Yellow	3 op Lemon Yellow		
	IVb23	R	S	cl	Shadow Blue	cl	Lt. Gray			3 op Redwood		
	IVb24	R	L	cl	Dk. Shadow Blue	cl	Lt. Gray			6 op Redwood		
	IVb25	R	VL	cl	Ultramarine	cl	Lt. Aqua Blue	op	White	16 op White		
	IVb26	R	VL	cl	Brite Navy	cl	Lt. Aqua Blue	op	White	16 op White		
	IVb27	R	M	cl	Brite Navy	op	Redwood	op	White	3 op Lemon Yellow 3 op Lt. Cherry Rose		
	IVb28	R	M	cl	Brite Navy	op	Redwood	op	White	4 op Redwood 4 op White 4 op Lemon Yellow		
	IVb29	R	M	cl	Brite Navy	cl	Brite Navy	op	White	3 op White		
	IVb30	R	L	cl	Brite Navy	cl	Brite Navy	op	White	3 op Broad White		
	IVb31	R	S	cl	Brite Navy	cl	Brite Navy	op	White	6 op White		
		R	M	cl	Brite Navy	cl	Brite Navy	op	White	6 op White		
	IVb32	R	L	cl	Brite Navy	cl	Brite Navy	op	White	7 op White		
	IVb33	R	M	cl	Brite Navy	cl	Brite Navy	op	White	16 op White (8 Pairs)		
	IVb34	R	M	cl	Brite Navy	cl	Brite Navy	op	White	16 op White		
	IVb35	R	L	cl	Dk. Navy	cl	Dk. Navy	op	White	8 op White		
	IVb36	R	VL	cl	Dk. Navy	cl	Dk. Navy	op	White	12 op White		
	IVb37	R	L	cl	Dk. Rose Brown	cl	Dk. Rose Brown	op	White	12 op White		

Table 5: Description of Class IV Beads (Fig. 8) (continued)

					Body of Bead					Surface Decoration	
Type	Bead Number	Shape	Size	Glass	Outside Colour Name	Glass	Core Colour Name	Glass	Middle Colour	Type Colour Name	
IVbb	IVbb1	R	M	op	Redwood	op	Black			**Compound Stripes**	
	IVbb2	R	M	op	Redwood	cl	Lt. Gray			3 Black	on White
	IVbb3	R	M	op	Redwood	cl	Apple Green			3 Black	on White
	IVbb4	R	L	op	Redwood	op	Black			3 Black	on White
	IVbb5	O	S	op	Redwood	op	Black			3 Brite Navy	on White
	IVbb6	R	M	op	Redwood	cl	Lt. Gray			3 Brite Navy	on White
	IVbb7	R	M	op	Redwood	cl	Apple Green			3 Brite Navy	on White
	IVbb8	O	M	op	Redwood	cl	Apple Green			3 Brite Navy	on White
	IVbb9	R	M	cl	Brite Navy	cl	Brite Navy	op	White	3 Redwood	on White
	IVbb10	R	M	cl	Brite Navy	cl	Brite Navy	op	White	3 Redwood Pairs	on White
	IVbb11	R	L	cl	Dk. Rose Brown	op	Black	op	White	3 Brite Navy	on White
IVb'	IVb'1	O	M	cl	Apple Green	cl	Apple Green	op	White	**Simple Stripes** 3 op White	
IVbb'	IVbb'1	R	L	cl	Brite Navy	cl	Brite Navy	op	White	**Compound Stripes** 3 Redwood	on White
IVg	IVg1	O	M	cl	Brite Blue	cl	Brite Blue	op	White	**"Flush Eyes"** 3 Redwood Stars Dots on Brite Blue Dots	on White

Table 5: Description of Class IV Beads (Fig. 8) (continued)

In Recording "Star" Beads the Layers are Named from the Outside Inward

Layers:				Outside	Body of Bead 2nd			3rd		4th
Type	Bead Number	Size	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name
Milled "Star" Beads with Plain Outside Layer										
IVk	IVk1	L	op	Redwood	op	White	cl	Brite Blue	op	White
	IVk2	M	cl	Brite Navy	op	White	cl	Brite Blue	op	White
	IVk3	M	cl	Brite Navy	op	White	op	Redwood	op	White
	IVk4	L	cl	Brite Navy	op	White	op	Redwood	op	White
	IVk5	F	cl	Brite Navy	op	White	op	Redwood	op	White
	IVk6	M	cl	Dk. Palm Green	op	White	op	Redwood	op	White
	IVk7	L	cl	Dk. Palm Green	op	White	op	Redwood	op	White

Type	Bead Number	Size	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name
Milled "Star" Beads with Stripes Inlaid in Outside Layer										
IVn	IVn1	M	tr	Oyster White	op	White	op	Redwood	op	White
	IVn2	M	tr	Oyster White	op	White	op	Redwood	op	White
	IVn3	L	tr	Oyster White	op	White	op	Redwood	op	White
	IVn4	M	tr	Oyster White	op	White	op	Redwood	op	White
	IVn5	M	tr	Oyster White	op	White	op	Redwood	op	White
	IVn6	L	tr	Oyster White	op	White	op	Redwood	op	White
	IVn7	F	tr	Oyster White	op	White	op	Redwood	op	White

Type	Bead Number	Size	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name	Glass	Colour Name
Milled "Star" Beads which look like Porcelain Imitations of IVn Beads										
IVnn	IVnn1	VL	op	Redwood	op	White	op	Redwood		
	IVnn2	VL	op	Redwood	op	White	op	Redwood		
	IVnn3	VL	op	Black	op	White	op	Black		
	IVnn4	VL	op	White	op	Redwood	op	White	op	Redwood
	IVnn5	VL	op	White	op	Redwood	op	White	cl	Brite Blue

	5th	**Simple Stripes and Comments about Individual Beads** Number of Stripes and their Colours
Glass	Colour Name	
cl	Brite Blue	Like IIIk1 but Milled Round
cl	Lt. Gray	Outside layer very thin making ridges of next layer appear as stripes
cl	Brite Blue	Outside layer very thin making ridges of next layer appear as stripes
cl	Brite Blue	Outside layer thick giving a solid blue appearance to surface
cl	Brite Blue	Like above bead but flattened
cl	Lt. Gray	
cl	Brite Blue	

Glass	Colour Name	**Simple Stripes**								
cl	Lt. Gray	6	op	Broad Redwood	6	cl	Thin Dk. Palm Green			
cl	Lt. Gray	6	op	Redwood	6	cl	Brite Navy			
cl	Brite Blue	6	op	Redwood	6	cl	Brite Navy			
cl	Lt. Gray	6	cl	Lemon Yellow	6	cl	Brite Navy			
cl	Lt. Gray	6	cl	Dk. Palm Green	6	cl	Brite Navy			
cl	Lt. Gray	4	op	Redwood	4	cl	Dk. Palm Green	4	cl	Brite Navy
cl	Lt. Gray	4	op	Redwood	4	cl	Dk. Palm Green	4	cl	Brite Navy

		Simple Stripes					
		8	op	White			
		6	op	White	6	cl	Brite Navy
		8	op	Lt. Gold			
		6	op	Broad Redwood	6	cl	Thin Brite Navy
		6	op	Broad Redwood	6	cl	Thin Brite Navy

Table 6: Description of Class "W" Beads (Fig. 9)

"Tube"

Type	Bead Number	Shape	Size	Glass	Name of Colour
Wla	Wla1	T	L	cl	Lt. Gray
	Wla2	T	M	cl	Oyster White
	Wla3	T	M	op	White

"Round"

Type	Bead Number	Shape	Size	Glass	Name of Colour
Wlb	Wlb1	R	L	cl	Lt. Gray
	Wlb2	R	VS	op	White
		R	S	op	White
		R	M	op	White
	Wlb3	R	M	cl	Pale Blue
	Wlb4	R	M	cl	Pale Blue (Opal)
		R	L	cl	Pale Blue (Opal)
		R	VL	cl	Pale Blue (Opal)
	Wlb5	R	M	tr	Pale Blue (Alabaster)
		R	L	tr	Pale Blue (Alabaster)
		R	VL	tr	Pale Blue (Alabaster)
	Wlb6	R	S	cl	Lt. Gold
		R	M	cl	Lt. Gold
	Wlb7	R	VS	cl	Amber
		R	L	cl	Amber
	Wlb8	R	L	cl	Maple
		R	VL	cl	Maple
	Wlb9	R	S	cl	Dk. Palm Green
	Wlb10	R	VS	op	Lt. Aqua Blue
		R	M	op	Lt. Aqua Blue
	Wlb11	R	VS	op	Robin's Egg Blue
		R	S	op	Robin's Egg Blue
		R	M	op	Robin's Egg Blue
	Wlb12	R	L	op	Brite Blue
	Wlb13	R	VS	op	Brite Copan Blue
		R	L	op	Brite Copan Blue
	Wlb14	R	VS	op	Brite Dutch Blue
		R	L	op	Brite Dutch Blue
	Wlb15	R	L	cl	Ultramarine
	Wlb16	R	L	cl	Brite Navy

"Oval"

Type	Bead Number	Shape	Size	Glass	Name of Colour
Wlc	Wlc1	O	S	op	White
	Wlc2	O	L	cl	Pale Blue (Opal)
	Wlc3	O	VL	tr	Pale Blue (Marble)
	Wlc4	O	L	cl	Lt. Gold
	Wlc5	O	L	cl	Amber
	Wlc6	O	S	cl	Maple
	Wlc7	O	S	cl	Citron
	Wlc8	O	L	cl	Turquoise
	Wlc9	O	S	op	Aqua Blue
	Wlc10	O	L	op	Lt. Aqua Blue
	Wlc11	O	L	cl	Ultramarine

"Donut"

Type	Bead Number	Shape	Size	Glass	Name of Colour
Wld	Wld1	DO	L	cl	Amber
	Wld2	DO	L	cl	Maple
	Wld3	DO	L	cl	Turquoise
	Wld4	DO	L	cl	Amethyst

"Corn Beads"

Type	Bead Number	Glass	Name of Colour
Wlla	Wlla1	cl	Lt. Gold
	Wlla2	op	Surf Green
	Wlla3	cl	Dk. Palm Green

Flat "Disk" Beads

Type	Bead Number	Glass	Name of Colour
Wllb	Wllb1	cl	Ultramarine

Table 6: Description of Class "W" Beads (Fig. 9) (continued)

Facetted "Five Sided" Beads

Type	Bead Number	Glass	Name of Colour
WIIc	WIIc1	op	Black
	WIIc2	cl	Lt. Gray
	WIIc3	cl	Pale Blue (Opal)
	WIIc4	cl	Lt. Gold
	WIIc5	cl	Amber
	WIIc6	cl	Cinnamon
	WIIc7	cl	Teal Green
	WIIc8	cl	Turquoise
	WIIc9	cl	Lt. Aqua Blue
	WIIc10	cl	Brite Copan Blue
	WIIc11	cl	Ultramarine
	WIIc12	cl	Brite Navy
	WIIc13	cl	Amethyst

"Raspberry Beads"

ype	Bead Number	Glass	Name of Colour
IId	WIId1	cl	Lt. Gray
	WIId2	cl	Pale Blue (Opal)
	WIId3	cl	Lt. Gold
	WIId4	cl	Amber
	WIId5	cl	Ultramarine
	WIId6	cl	Brite Navy
	WIId7	cl	Amethyst

"Melon" Beads

Type	Bead Number	Glass	Name of Colour
WIIe	WIIe1	cl	Lt. Gray
	WIIe2	cl	Lt. Gold
	WIIe3	cl	Amber
	WIIe4	cl	Cinnamon
	WIIe5	cl	Teal Green
	WIIe6	cl	Brite Copan Blue
	WIIe7	cl	Ultramarine
	WIIe8	cl	Brite Navy

"Ridged Tube" Beads

Type	Bead Number	Size	Glass	Name of Colour
WIIf	WIIf1	M	cl	Lt. Gold
	WIIf2	L	cl	Maple
	WIIf3	M	cl	Apple Green
	WIIf4	M	op	Surf Green
	WIIf5	L	cl	Turquoise

Round Bead with Pressed Design

Type	Bead Number	Size	Glass	Name of Colour
WIIg	WIIg1	M	cl	Lt. Gold
	WIIg2	M	cl	Apple Green

Table 6: Description of Class "W" Beads (Fig. 9) (continued)

WIII Type is any Wirewound bead of WI or WII Type with applied Decoration

	Type	Bead Number	Glass	Colour	Decoration
Solid Plain Glass Overlay	WIIIa	WIIIa1	tr	White	with op Coral Plain Coating
		WIIIa2	tr	White	with cl Amethyst Plain Coating
Plain Glass Overlaid in a Design	WIIIb	WIIIb1	tr	White	with 3 groups of 3 cl Dk. Palm Green Dots
Plain Glass Inlaid in a Design	WIIIc	WIIIc1	cl	Ultramarine	— A Side; 3 five pointed stars and comet — B Side; Man in the moon and five pointed star
		WIIIc2	cl	Ultramarine	— A Side; 3 five pointed stars with "S" growing out of top star — B Side; Crescent Moon connected to cross (Variation of WIIIc1)
Complex Designed Glass Overlay	WIIId	WIIId1	cl	Ruby	Large Oval with fine cane of op White & cl Brite Navy twisted together applied in a spiral around bead
Overlay of Material Other than Glass	WIIIe	WIIIe1	op	Black	"Melon" with Gold Leaf Overlay

Ia1	Ia2	Ia3	Ia4	Ia5	Ia6	Ia7	Ia8	Ia9	Ia10	Ia11
Ia12	Ia13	Ia14	Ia15	Ia16	Ia17	Ia18	Ia19	Ia20	Ia21	Ia22
•	Ib1	Ib2	Ib3	Ib4	Ib5	Ib6	Ib7	Ib8	Ib9	Ib10
Ib11	Ib12	Ib13	Ib14	Ib15	Ib16	Ib17	Ib18	Ib19	Ib20	Ib21
Ib22	Ib23	Ib24	•	Ibb1	Ibb2	Ibb3	Ibb4	Ibb5	Ibb6	•
Ib'1	Ib'2	Ib'3	Ib'4	•	Ibb'1	•	Ic1	Ic2	Ic3	Ic4
Ic5	Ic6	Ic7	Ic8	Ic9	Ic10	Ic11	Ic12	Ic13	Ic14	Ic15
•	Ic'1	Ic'2	Ic'3	•	Id1	•	Id'1	•	Ie1	•
Ie'1	Ie'2	•	If1	If2	If3	If4	If5			
IIa1	IIa2	IIa3	IIa4	IIa5	IIa6	IIa7	IIa8	IIa9	IIa10	IIa11
IIa12	IIa13	IIa14	IIa15	IIa16	IIa17	IIa18	IIa19	IIa20	IIa21	IIa22
IIa23	IIa24	IIa25	IIa26	IIa27	IIa28	IIa29	IIa30	IIa31	IIa32	IIa33
IIa34	IIa35	IIa36	IIa37	IIa38	IIa39	IIa40	IIa41	IIa42	IIa43	IIa44
IIa45	IIa46	IIa47	IIa48	IIa49	IIa50	IIa51	IIa52	IIa53	IIa54	IIa55
IIa56	IIa57	IIa58	IIa59	IIa60	IIa61	•	IIb1	IIb2	IIb3	IIb4
IIb5	IIb6	IIb7	IIb8	IIb9	IIb10	IIb11	IIb12	IIb13	IIb14	IIb15
IIb16	IIb17	IIb18	IIb19	IIb20	IIb21	IIb22	IIb23	IIb24	IIb25	IIb26
IIb27	IIb28	IIb29	IIb30	IIb31	IIb32	IIb33	IIb34	IIb35	IIb36	IIb37
IIb38	IIb39	IIb40	IIb41	IIb42	IIb43	IIb44	IIb45	IIb46	IIb47	IIb48
IIb49	IIb50	IIb51	IIb52	IIb53	IIb54	IIb55	IIb56	IIb57	IIb58	IIb59
IIb60	IIb61	IIb62	IIb63	IIb64	IIb65	IIb66	IIb67	IIb68	IIb69	IIb70
IIb71	IIb72	IIb73	IIb74	•						

IIbb1	IIbb2	IIbb3	IIbb4	IIbb5	IIbb6	IIbb7	IIbb8	IIbb9
IIbb10	IIbb11	IIbb12	IIbb13	IIbb14	IIbb15	IIbb16	IIbb17	IIbb18
IIbb19	IIbb20	IIbb21	IIbb22	IIbb23	IIbb24	IIbb25	IIbb26	IIbb27
IIbb28	IIbb29	•	IIb'1	IIb'2	IIb'3	IIb'4	IIb'5	IIb'6
IIb'7	IIb'8	IIb'9	IIb'10	IIb'11	IIb'12	IIb'13	•	IIbb'1
IIbb'2	•	IIe1	IIe2	•	IIg1	IIg2	IIg3	IIg4
IIg5	•	IIh1	•	IIj1	IIj2	IIj3	IIj4	IIj5	IIj6
IIIa1	IIIa2	IIIa3	IIIa4	IIIa5	IIIa6	IIIa7	IIIa8	IIIa9
IIIa10	IIIa11	IIIa12	•	IIIb1	IIIb2	IIIb3	IIIb4	IIIb5
IIIb6	IIIb7	IIIb8	IIIb9	IIIb10	•	IIIbb1	IIIbb2	IIIbb3
IIIbb4	IIIbb5	IIIbb6	IIIbb7	IIIbb8	•	IIIc1	IIIc2	IIIc3
•	IIIc'1	IIIc'2	IIIc'3	IIIc'4	•	IIIe1	IIIe2	•
IIIe'1	•	IIIf1	IIIf2	•	IIIk1	IIIk2	IIIk3	•
IIIm1	•	IIIn1	IIIn2	IIIn3				
IVa1	IVa2	IVa3	IVa4	IVa5	IVa6	IVa7	IVa8	IVa9
IVa10	IVa11	IVa12	IVa13	IVa14	IVa15	IVa16	IVa17	IVa18
IVa19	•	IVb1	IVb2	IVb3	IVb4	IVb5	IVb6	IVb7
IVb8	IVb9	IVb10	IVb11	IVb12	IVb13	IVb14	IVb15	IVb16
IVb17	IVb18	IVb19	IVb20	IVb21	IVb22	IVb23	IVb24	IVb25
IVb26	IVb27	IVb28	IVb29	IVb30	IVb31	IVb32	IVb33	IVb34
IVb35	IVb36	IVb37	•	IVbb1	IVbb2	IVbb3	IVbb4	IVbb5
IVbb6	IVbb7	IVbb8	IVbb9	IVbb10	IVbb11	•	IVb'1	•
IVbb'1	•	IVg1	•	IVk1	IVk2	IVk3	IVk4	IVk5
IVk6	IVk7	•	IVn1	IVn2	IVn3	IVn4	IVn5	IVn6

IVn7	•	IVnn1	IVnn2	IVnn3	IVnn4	IVnn5		
WIa1	WIa2	WIa3	•	WIb1	WIb2	WIb3	WIb4	WIb5
WIb6	WIb7	WIb8	WIb9	WIb10	WIb11	WIb12	WIb13	WIb14
WIb15	WIb16	•	WIc1	WIc2	WIc3	WIc4	WIc5	WIc6
WIc7	WIc8	WIc9	WIc10	WIc11	•	WId1	WId2	WId3
WId4								
WIIa1	WIIa2	WIIa3	•	WIIb1	•	WIIc1	WIIc2	WIIc3
WIIc4	WIIc5	WIIc6	WIIc7	WIIc8	WIIc9	WIIc10	WIIc11	WIIc12
WIIc13	•	WIId1	WIId2	WIId3	WIId4	WIId5	WIId6	WIId7
•	WIIe1	WIIe2	WIIe3	WIIe4	WIIe5	WIIe6	WIIe7	WIIe8
•	WIIf1	WIIf2	WIIf3	WIIf4	WIIf5	•	WIIg1	WIIg2
WIIIa1	WIIIa2	•	WIIIb1	•	WIIIc1	WIIIc2	•	WIIId1
•	WIIIe1							

For those who may wish to investigate this subject further, the following selected titles are offered. There is not, so far as the authors know, an entirely satisfactory treatment of the making of glass beads in English, and it is necessary to piece the story together from various sources, such as Dillon, Nesbitt and Pellatt, after having first read a general exposition of glass-making such as may be found in Marston. Those who are able to do so may wish to go further afield and examine the writing of some of the more outstanding continental authors. The subject becomes complicated at this point because numerous writers have discussed the manufacture of glass objects (though seldom beads specifically), and some of the more important are of considerable antiquity, e.g., Kunckel, Neri and Theophilus. Unfortunately, these last three are not easily obtainable. The publications of Morazzoni and Pasquato, Pazaurek and Zecchin, however, are recent and perhaps the most satisfactory for the readers of this article.

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The Roma Settlement at Brudenell Point,
Prince Edward Island

Abstract

In 1731, the Compagnie de l'Est de l'Ile Saint-Jean was established to engage both in a commercial fishing venture and in settling the eastern part of Ile Saint-Jean, now Prince Edward Island. Jean Pierre Roma, the director, came to Brudenell Point in June, 1732, and began his task of setting up a colony. Disagreements with the clergy and with his partners in France plagued Roma during the first years of the establishment, and in 1737, he became sole proprietor. Despite losses through shipwreck and plagues of mice and grasshoppers, he struggled on until 1745. In June of that year, a detachment of British troops sent from Louisbourg completely destroyed the establishment. Roma escaped with his family to Quebec and Martinique, and his project was abandoned.

On July 17, 1731, a grant authorized by King Louis XV of France and his Minister of the Marine, the Comte de Maurepas, was made to Sieurs Claude Cotterel, merchant at Rouen, Joseph du Bocage of Blansville, Joseph Philippe Narcis and Jean Pierre Roma of Paris.[1] The grant was of 3,500 *arpents* (about 127 miles) frontage and 40 *arpents* (about 1.5 miles) depth on the eastern coast of Ile Saint-Jean, now Prince Edward Island. It included the lands drained by the three rivers now known as the Brudenell, the Montague and the Cardigan, but was not to touch any lands already granted to inhabitants or cleared by them. The grant was to be held *en franc aleu noble*, with no royal dues, but "in homage" to Louisbourg. Justice was reserved for the king to be administered by the sub-delegate of the Intendant of New France in Ile Saint-Jean.

The only other obligations placed on the company, La Compagnie de l'Est de l'Ile Saint-Jean, were those of reporting any mines or minerals to the king or his appropriate officer, of having its tenants conserve oak suitable for ship building, and of allowing the king any land he needed for posts or government buildings. The company was to bring out 80 persons with the necessary stock in 1732, and 30 annually in succeeding years. These settlers were to be encouraged to clear lands and construct both public and private buildings and roads. The company was to establish churches, in which its members would be honoured as patrons. It was also permitted to establish fish-drying stations and stores on the north coast, where it would be given land in proportion to the number of shallops used there in fishing. If the company failed to fulfil its obligations, the land was to revert to the Royal Domain.

Up until this time, there had been only one attempt by a chartered company to establish permanent settlement in Ile Saint-Jean, that of the Comte de Saint Pierre and his associates in the early 1720s. Some colonists were brought from France at that time, but the venture was soon abandoned because of the financial failure of the company in France.[2] In 1730, there were on the island about 325 settlers, the majority of whom had come out under the Comte de Saint Pierre or had emigrated from British-held Acadia to be under French rule. These were scattered around the island but were most heavily concentrated at St. Peter's on the north, and at Port La Joye and the Northeast River (Charlottetown Harbour and the Hillsborough River).[3]

Jean Pierre Roma was appointed director of the company. He arrived in Ile Saint-Jean in June, 1732, and began at once to lay the foundations of what he hoped would become a thriving colony. The exact site chosen was at Brudenell Point, the point between the Brudenell and Montague rivers. Because of its proximity to the Cardigan River as well as the Brudenell and the Montague, the site was known as Three Rivers.

Almost immediately Roma ran into difficulties. His relations with the chaplain of the company, Abbé Bierne, deteriorated rapidly. Roma, as Commandant and Director of the company, regarded himself as having complete control of the affairs of the colony: the abbé, on the other hand, saw his authority as emanating from Heaven and therefore superior to any lay power Roma might have.[4] When Roma gave him a written *congé* on the grounds that he was plotting behind his back to destroy the company, Bierne appealed to Dubuisson, the sub-delegate of the Intendant in Ile Saint-Jean. Dubuisson tended to side with the abbé because he felt Roma had acted improperly when speaking to the priest,[5] but he lacked the power to enforce his opinion and was therefore reduced to attempting conciliation. As for Roma, he had on his side De Pensens, the Commandant in Ile Saint-Jean, Le Normant, Commissaire-Ordonnateur, and St. Ovide de Brouillan, Governor in Ile Royale, now Cape Breton Island.[6] The conflict was eventually resolved by St. Ovide, who arranged for the abbé to become a missionary to the Micmacs, and when this proved unsatisfactory, to return to France.

ocation of Brudenell Point, Prince Edward Island.

Roma's difficulties with the clergy were not yet over, however. In 1737, he was complaining that two girls whom he had brought over from France had been enticed away from him in Louisbourg by people wanting servant girls, and that these people had been aided by the Father Superior of the Récollets at Louisbourg.[7]

Roma's relations with his partners back in France were also somewhat stormy. The partners were interested only in profits from the fisheries, and were unconcerned with the general welfare of the colony. Ignoring the fact that Roma's initial outlay in establishing the colony, in setting up fishing operations on the north shore and in building shallops for the fisheries must have consumed a considerable amount of the advance of 91,000 *livres*, they refused further financial assistance when the company failed to realize a profit in its first year of operation.[8] In his own defence Roma sent a letter to the Governor and Intendant of Ile Royale and Ile Saint-Jean and to the Lieutenant du Roi in Ile Saint-Jean.[9] He denied that any losses resulted from any fault of his own, indicated that he had in fact accomplished a surprising amount considering the financial backing he had had, and pointed out the deterrent effect the failure of such an enterprise would have on any other company contemplating a similar venture. Following the letter he drew up a detailed account of "Travaux de l'Etablissement de la Compagnie de l'Ile Saint-Jean depuis le 18 juin, 1732 jusqu'au 18 août 1734." Here he set out each work, its purpose, and the manner in which it was constructed.

A cape 36 ft. high, sloping down to a length of 60 ft. and a width of 80 ft. formed the point which Roma chose as the site of his settlement. To protect the point from being washed into the sea, he levelled it off by reducing the peak and building up the base with rocks and timber. A pier 45 ft. long and 10 ft. wide was built out from the slope to facilitate the loading and unloading of boats. About 300 tons of stones were required for its construction. At the end of this pier at high tide, the water was 11 ft. deep. At one side, Roma had built a smaller wooden pier 40 ft. long by 12 ft. wide for the use of smaller shallops and canoes. Roma then cleared the cape for an area of about 1,700 ft. by 1,200 ft. Trees were cut down and the branches burned, and about 6,000 stumps of at least half a foot in diameter were removed. The whole area was then levelled to make way for buildings and walks.

Nine buildings were erected. Of the three main houses, one 80 ft. long with a storeroom was to house the company, another was for the fishermen, and the third was for the employees of the company and strangers. These buildings were divided into rooms, offices and alcoves in order to sleep 36 people comfortably and to enable Roma to lock up anything of value. Another building 50 ft. long was built for the ships' officers and their men, while a second one of the same length was to be a storehouse. For the master workmen and their assistants a building 62 ft. long was provided. Here Roma hoped, in the future, to establish a brewery for beer made from grain. Finally, three smaller buildings were erected for a bakery, a forge, and a stable. This construction called for 3,000 posts, 450 rafters, 200 rails, 50 flagstones, 170 beams, 5,000 planks and 1,500 joists. Any small openings were plugged with moss and clay. Some of this material was taken from the woods surrounding the settlement but some was brought from greater distances. Stones were collected and clay was transported about three-quarters of a league to build 13 chimneys and an oven of bricks.

To keep food, Roma had an ice-house built, and to supply it two wells were dug and four pumps installed. So that the ships might obtain fresh water more easily, he built up a spring near the shore which had been covered by six feet of water at high tide. When the winter ice destroyed this source, however, another abundant one was found six or seven hundred paces from the cape. Arrangements were made to carry water to the shallops at the shore.

Five small gardens surrounded by fences were laid out beside the houses, and two larger ones were set out beside the forge and the bakery. Such vegetables as cabbage and turnips were grown. Land was cleared and stumps removed for two more fields of about two and a half *arpents* each, one for peas and the other for wheat. These, too, were surrounded by fences. For future use, the land was cleared back from the cape about three-quarters of a league (two miles).

To preserve food from the heat in summer and excessive cold in winter, a large cellar 120 ft. long, 16 to 20 ft. wide and 7.5 ft. deep was built beside the company house. Forty heavy beams supported by *piquets* and trees serving as uprights were crossed by large logs and rafters. This was covered by brush and the earth removed from the cellar, and doors were built at either end. Much of the material was brought some distance from the woods.

Up to the time of writing (1734), Roma estimated that 800 quintals of flour had been used in the bakery, and about 1,200 barrels of water were drawn for drinking, washing, making beer and watering the horses. A large amount of wood was used to keep fires going in the 13 fireplaces night and day for 7 months of the year.

In addition to the buildings, two large reservoirs for water, two small flat boats, two canoes and six shallops for fishing were built, as well as three small boats to carry supplies and a framework for operating the sail on a ship. Food for the animals in the form of coarse marsh grass was brought from the area around the Rivière d'Esturgeons (Sturgeon Creek).

To facilitate transportation from the woods and other settlements, roads were constructed. The first road to St. Peter's, about 8 leagues away, included a bridge 75 ft. long by 12 ft. wide. This road was subsequently abandoned because, although it crossed two rivers, there were still two leagues of water to be traversed. It was replaced by a road of eight and one half leagues which avoided the rivers. A road to St. Peter's was vital because of the important fishing station there, and because the voyage by water was 22 leagues long and

uncertain in an emergency in a wind-propelled vessel.

Roads were also built to the Rivière d'Esturgeons, about 1,200 paces; to Port à la Rivière du Nord, about one league; to Souris, four or five leagues away; and to Port La Joye to assure the Lieutenant du Roi in Ile Saint-Jean of communication in case of a war with England. The road to St. Peter's was the best one. Many trees were left lying across the road to Port La Joye. The road to Souris was made in the hope of establishing a fishing centre there, but this plan did not materialize because the harbour was more rocky than anticipated.

Roma described in detail the considerable progress made in clearing the land and setting up a fishing station at St. Peter's. Storehouses, drying platforms, and buildings to house the men were built and about 55 people were involved in fishing operations there. Supplies of commodities like bread, salt, spirits and molasses were sent to St. Peter's from Three Rivers.

Roma envisaged the colony as a center for the fishing industry, and as the hub of a three-cornered trade between Quebec, Ile Saint-Jean and the West Indies.[10] Not only would the company's five large ships be used to take fish to France, but also they would carry food from Quebec to Ile Saint-Jean until the latter colony became self sufficient. Then they would proceed to the West Indies, loaded with fish and lumber, and return with sugar, molasses and coffee.

Despite his detailed account of his achievements, Roma's partners in France continued to feel that he was not doing his best and that the company was suffering unnecessary losses. By way of comment it should be noted that those on the spot, De Pensens,[11] St. Ovide and Le Normant,[12] all wrote in praise of Roma's work. In the fall of 1736, Roma began negotiating with his partners in France and the Minister of the Marine, and the next May, after his partners decided to cede to him the grant of eastern Ile Saint-Jean, he became sole proprietor and Commandant of his concession, under the aegis of Louisbourg.[13]

On his return from his visit to France in 1737, Roma wrote a report to the Minister of Affairs in the colony,[14] in which he described progress in his settlement. In his absence his son had been forced to distribute part of the seed wheat for food, so the crop of wheat was small, although the crop in oats and peas had been successful. He had authorized the marriage of two of his people and was planning to establish them in such a way as to make others desire similar treatment.

The Father Superior of the Récollets was still a subject of complaint: not only had he enticed away the two girls and a cooper, but also he had lured away three of Roma's men, who took a fully rigged shallop and sailed for Louisbourg. Roma asked for seed from Louisbourg, and begged the Minister to consider his action favourably, because now that he was alone in the venture, it was more difficult for him to defend his position.

Further difficulties beset Roma. In 1738, a plague of field mice completely ruined crops throughout the island.[15] Another problem was that of attracting settlers to the colony. Because newcomers to the island tended to prefer to take up free land from the Crown rather than settle under a *seigneur*, Roma was forced to bring in as settlers convicted salt smugglers who had been allowed to choose between the galleys and the colonies.[16]

In the spring of 1741, Roma was again writing of difficulties, this time the loss of a ship and all its cargo in a shipwreck.[17] By the next fall he found himself forced to ask for an advance of 500 *livres* which he hoped to repay the following year from a more successful crop and fishing season.[18]

Roma's venture in Ile Saint-Jean came to an end on June 20, 1745, when English troops from the victorious expedition to Louisbourg landed at Three Rivers and completely destroyed the establishment there. According to the account of Prevost, *Commissaire-Ordonnateur* at Ile Royale, Roma, his son, daughter and five servants escaped to the woods while the enemy looted and destroyed by fire all that remained. The company's defences consisted of one small six-pounder which must have been useless against the invaders. Besides the buildings, Roma lost 60 bushels of wheat, 10 bushels of oats, 8 bushels of peas, 4 horses, 50 sheep, 10 cows, 10 calves, 20 pigs and about 100 fowl.[19] Having no alternative but starvation, Roma made his way to St. Peter's and from there to Quebec. The settlement at Three Rivers ceased to exist.

Roma spent the remaining war years in Quebec where he was employed with the Royal Magazines. In 1752, he was suggested as a possible replacement for M. des Goutins as Sub-Delegate of the Intendant in Ile Saint-Jean, but was not appointed, perhaps on Prevost's advice.[20]

Roma spent some time in Martinique after leaving New France. Although he never returned to Ile Saint-Jean, his interest in it continued. From Martinique he sent to the Minister an elaborate plan for the development of that island and Ile Royale.[21]

Roma's settlement was completely destroyed. In the 1740s and early 1750s as tension built up between the French and the English over possession of Nova Scotia, more and more Acadians were finding their way to French territory in Ile Saint-Jean. Settling them on lands not already ceded was a problem, however. De Bonnaventure and des Goutins, Commandant and sub-delegate of the Intendant, were eventually instructed to cede lands unoccupied or only partly occupied to these new settlers. If the owners objected and could produce good claims, the newcomers would be required to pay *cens et rentes* on the same scale used in Canada.[22] This ruling applied to Roma's territory, but no new settlement appears to have been made on it before 1755.

In the summer of 1751, Colonel Franquet, an officer of the Engineers who had been sent out to supervise the new fortifications at Louisbourg, visited Ile Saint-Jean and produced a detailed report describing the situation there making various recommendations for its development. During the course of his tour, he inspected the very

fine harbour and good soil at Three Rivers.[23] He remarked that there were neither inhabitants nor buildings at the site of the establishment destroyed in 1745. Although it appeared that Roma was never going to take up his land again, his charter was still in force. For this reason, settlers preferred, instead of settling on these lands, to take up Crown lands where their titles would be more secure. Franquet recommended that this situation be resolved so that full use might be made of the advantages offered by the site. He considered Three Rivers as a strategic area for defence and shelter, and so recommended the construction of a masonry redoubt. This recommendation was not implemented, however.[24]

At the time of the census of the Sieur de la Roque in 1753, there were no inhabitants at Three Rivers.[25] In 1755, however, missionaries reported to the Abbé de l'Ile Dieu, Vicar General, that there were 101 persons at Three Rivers, that more were arriving, and that a missionary was badly needed.[26] (It was in 1755 that the French Fort Beauséjour in the Isthmus of Chignecto fell and Acadian inhabitants of Nova Scotia were expelled from the province. Many Acadians who had escaped the expulsion made their way to Ile Saint-Jean, and it was these refugees who now appeared at Three Rivers.) After the final capitulation of Louisbourg in 1758, the English policy with regard to Ile Saint-Jean was one of deportation, and it appears that the residents of Three Rivers went to the islands of St. Pierre and Miquelon.[27]

In 1765, as part of his general survey of British North America, Captain Samuel Holland surveyed the island. The island was to be divided into counties, parishes and township lots, and Brudenell Point fell into lot 53 of St. George's Parish in King's County. In his remarks about the boundaries of the lots, however, Holland said that there were no cleared lands nor houses in lot 53.[28]

It has been difficult to find records detailed enough to indicate whether or not any actual building took place at Brudenell Point after the destruction of Roma's settlement in 1745. If the refugees undertook any construction between 1755 and 1758, no record of it is known. Holland found no houses or cleared lots in 1765. D. C. Harvey, in his introduction to Walter Johnstone's *Letters*, says that in 1803, 22 newcomers settled at Brudenell.[29] There is, however, a town called Brudenell a few miles back from the point and it could have been to this site that the settlers came. John Stewart, describing Prince Edward Island in 1806, said that the Earl of Selkirk, the Earl of Westmoreland and the Honourable Robert Dundas Saunders, who owned lot 53, were starting settlement there.[30] In his chapter entitled "Discovery and Settlement," however, Stewart[31] referred to the French settlement which had been abandoned on Brudenell Point, and said that "on this there seems to have been about 200 acres of cleared land." It would appear, therefore, that the settlers of 1803 mentioned by Harvey were not at the point.

In 1926, Harvey wrote that the only reminder of the 13 years Roma had spent at Brudenell Point was a solitary depression in the ground.[32] Helen Jean Champion, in 1939, saw one long and three smaller depressions marking the site of the settlement at Three Rivers although these could represent the remains of building of a later period.[33]

At the site now there are what appear to be remains of several foundations, a well and some brick debris back from the shore. Until 1968, there has been no proper excavation done at the site, although there is evidence that amateurs have been digging haphazardly. There has been considerable shoreline recession over the years on the point, and it is possible that part of the site is now under water. A professionally conducted archaeological investigation begun in 1968 is expected to reveal much more accurately how much of the original site remains.

1 Public Archives of Canada (hereafter cited as PAC), MG1, Series B, Vol. 55 (3), pp. 755-59, Brevet de Concession, Fontainebleau, 17 July 1731.
2 D.C. Harvey, *The French Regime in Prince Edward Island* (New Haven: Yale University Press), pp. 40-55.
3 Ibid. pp. 65, 67.
4 PAC, MG1, C^{11}B, Vol. 14, pp. 222-33, Roma to De Pensens, Commandant in Ile Saint-Jean, 27 October 1733.
5 Roma denied this. PAC, MG1, C^{11}B, Vol. 14, pp. 222-33, Roma to De Pensens, 27 October 1733.
6 PAC, MG1, C^{11}B, Vol. 15, p. 151, St. Ovide and Le Normant to the Minister, 2 October 1734.
7 PAC, MG1, C^{11}B, Vol. 19, pp. 71-4, Unsigned document to M. le Commissaire-Ordonnateur of Ile Royale on the subject of the Sieur Roma; PAC, MG1, C^{11}B, Vol. 19, pp. 174-9, Roma to the Minister, 14 October 1737.
8 PAC, MG1, C^{11}B, Vol. 16, p. 132, Roma to the Minister, 2 September 1734; PAC, MG1, C^{11}B, Vol. 16, p. 174, Extrait de la Deliberation de la Compagnie de l'Est de l'Ile Saint-Jean, 21 February 1734.
9 PAC, MG1, C^{11}B, Vol. 16, pp. 60-100, Roma to Governor at Ile Royale and Ile Saint-Jean, 19 September 1734.
10 PAC, MG1, C^{11}B, Vol. 16, pp. 41-50, Sommaire du Projet de l'Entreprise de la Compagnie de l'Ile Saint-Jean.
11 PAC, MG1, C^{11}B, Vol. 16, pp. 34-9, De Pensens to the Minister, 20 October 1734.
12 PAC, MG1, C^{11}B, Vol. 15, p. 151, St. Ovide and Le Normant to the Minister, 2 November 1734.
13 PAC, MG1, Series B, Vol. 65 (4), pp. 87-8, President of Navy Board to MM. St. Ovide de Brouillan and Le Normant, 13 May 1737.
14 PAC, MG1, C^{11}B, Vol. 19, pp. 174-9, Roma to the Minister, October 1737.
15 PAC, MG1, C^{11}B, Vol. 20, p. 97, Le Normant to the Minister, 28 October 1738. This was not the first occasion on which field mice had destroyed crops on the island. The phenomenon had occurred with disastrous effects in 1724 and 1728. Roma described the mice in detail in a memoir in 1750, PAC, MG1, C^{11}B, Vol. 29 (2), p. 352ff.
16 PAC, MG1, Series B, Vol. 65 (4), p. 887, President of the Navy Board to MM. St. Ovide de Brouillan and Le Normant, 13 May 1737.
17 PAC, MG1, C^{11}B, Vol. 23, pp. 162-4, Roma to the Minister, 31 May 1741.
18 PAC, MG1, C^{11}B, Vol. 23, pp. 165-8, Roma to the Minister, 1 September 1741.
19 PAC, MG1, C^{11}B, Vol. 32, p. 245, Prevost to the Minister, 27 October 1752.
20 PAC, MG1, C^{11}B, Vol. 32, p. 245, Prevost to the Minister, 27 October 1752. Prevost wrote that with his independent spirit Roma would have difficulty reconciling anyone to him, that he had a reputation for partiality and that although he had had commercial experience he was not acquainted with the service.
21 PAC, MG1, C^{11}B, Vol. 29 (2), pp. 287-504, Roma to the Minister, 11 March 1750.
22 PAC, MG1, C^{11}B, Vol. 28, pp. 8-9, M. des Herviers, Gouverneur, and M. Prevost, Ordonnateur, to the Minister, 15 August 1749.
23 PAC, MG1, C^{11}C, Vol. 9, p. 166, "Journal of the voyage of Mr. Franquet to . . . Three Rivers . . .", dated 20-21 December 1751.
24 John Caven, "A Journey from Port La Joye to Trois Rivières (Georgetown) in 1751," *Prince Edward Island Magazine*, Vol. II, No. 9, p. 288.

25 *eport Concerning Canadian Archives* 1906, Vol. II, p. 77-165. Census of Sieur de la Roque.
26 AC, MG1, 22, G. Vol. 467, Pt. 2, pp. 286, 289, eport to the Abbé de l'Isle Dieu, 1755.
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30 ohn Stewart, *An Account of Prince Edward Island* London: W. Winchester and Son), p. 20.
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33 Helen J. Champion, *Over on the Island* (Toronto: Ryerson Press), p. 135.

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